

OFFICE COMMUNICATION SYSTEMS

INPUT
LIBRARY

ABOUT INPUT

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients'

needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international consulting firm. Clients include over 100 of the world's largest and most technically advanced companies.

Headquarters

2471 East Bayshore Road
Suite 600
Palo Alto, California 94303
(415) 493-1600
Telex 171407

Dallas

Campbell Center II
8150 N. Central Expressway
Dallas, Texas 75206
(214) 691-8565

Detroit

340 N. Main Street
Suite 204
Plymouth, Michigan 48170
(313) 459-8730

Y-BNR

BCR

Brad O'Brien

AUTHOR

Office Communication Systems

(10/81)

BRANCHES

lia
m Australia
d Centre, 7-9 Merriwa St.,
x 110,
N.S.W. 2072
8-8199
A 24434

tema SRL
Milano
erga 36

34-2850

INPUT

Planning Services for Management

Marked me 8/2/82

000013

X

OFFICE COMMUNICATION SYSTEMS

Prepared For:
BELL NORTHERN RESEARCH, INC.

INPUT LIBRARY

OCTOBER 1981



Digitized by the Internet Archive
in 2014

OFFICE COMMUNICATION SYSTEMS

CONTENTS

	<u>Page</u>
I INTRODUCTION	1
A. Objectives Of The Study	1
B. Methodology	4
C. Analysis And Conclusions	7
II EXECUTIVE SUMMARY	9
A. Major Conclusions	9
B. Existing Communications Systems And Practices	13
C. Communications-Related Problems	16
D. Future Communications Plans	18
E. Customers' Attitudes Toward Specific Solutions	22
1. Speed Code And Protocol Conversion For Data Communications	23
2. Voice Messaging (Call Forward, Call "Answering")	29
3. Data Text Messaging	29
4. Electronic Filing	30
5. Real Time Interactive Image (Facsimile) Communications	30
6. Messaging (Store And Forward) Image (Facsimile) Communications	31
7. Communications Management	32
8. Private Networking Features Of Controller	32
9. Teleconferencing	33
10. Provision Of Transparent Access To Data Bases Through "Mediation," Auto-Log-On	33
11. Provision Of On-Line Corporate Directory Service Including Names, Titles, Telephone Numbers, And Other Administrative Information (Other Services - Mail, Facsimile, Parcels)	34
12. Provision Of Communications Between Different Models Of Word Processors	34
F. Acquisition Process For Communications	35
G. The Remaining Report	39
III USER PLANNING ISSUES	41
A. Company Plans	42
1. Communications Planning	42
2. Scope Of The Plan	42
3. Organization	43

	<u>Page</u>
4. Geography	43
5. Responsible For Planning	44
6. Implementation Of The Plan	44
7. Reactive Versus Initiative Organizations	44
8. The Impact Of New Office Buildings	45
B. Importance Of Communications In Organizations	45
1. The Level Of Importance	45
2. The Effect Of Network Failures	46
C. Focal Point Of Office Information Systems	46
1. Description	46
2. Discussion	47
3. Survey Data	48
4. Identified Problems	48
5. Identified Plans	49
6. Level Of Participation	49
7. Level Of Understanding	49
8. Level Of Agreement	49
9. Conclusions	49
D. Organization	50
1. Description	50
2. Discussion	50
3. Survey Data	52
4. Identified Problems	53
5. Identified Plans	53
6. Level Of Participation	53
7. Level Of Understanding	53
8. Level Of Agreement	53
9. Conclusions	53
E. Performance Measurement	54
1. Description	54
2. Discussion	54
3. Survey Data	55
4. Identified Problems	55
5. Identified Plans	55
6. Level Of Participation	56
7. Level Of Understanding	56
8. Level Of Agreement	56
9. Conclusions	56
F. Justification Of Acquisitions	56
1. Description	56
2. Discussion	57
3. Survey Data	58
4. Identified Problems	58
5. Identified Plans	58
6. Level Of Participation	58
7. Level Of Understanding	58
8. Level Of Agreement	59
9. Conclusions	59

	<u>Page</u>
G. Measurement Of Office Worker Productivity	59
1. Description	59
2. Discussion	59
3. Survey Data	60
4. Identified Problems	60
5. Identified Plans	60
6. Level Of Participation	60
7. Level Of Understanding	62
8. Level Of Agreement	62
9. Conclusions	62
H. Measurement Of Communications System Performance	62
1. Description	62
2. Discussion	62
3. Survey Data	63
4. Identified Problems	65
5. Identified Plans	65
6. Level Of Participation	65
7. Level Of Understanding	65
8. Level Of Agreement	65
9. Conclusions	65
I. Office Automation	66
1. Description	66
2. Discussion	66
3. Survey Data	67
4. Identified Problems	67
5. Identified Plans	68
6. Level Of Participation	68
7. Level Of Understanding	68
8. Level Of Agreement	68
9. Conclusions	68
J. Integration Of Voice And Data Communication Networks	69
1. Description	69
2. Discussion	69
3. Survey Data	70
4. Identified Problems	70
5. Identified Plans	70
6. Level Of Participation	70
7. Level Of Understanding	70
8. Level Of Agreement	70
9. Conclusions	71
IV OFFICE COMMUNICATION APPLICATIONS	73
A. Voice Communication Operations	73
1. Description	73
2. Discussion	73
3. Survey Data	74
4. Identified Problems	74
5. Identified Plans	76
6. Level Of Participation	76
7. Level Of Understanding	76

	<u>Page</u>
8. Level Of Agreement	76
9. Conclusions	76
B. On-Line Corporate Directory	77
1. Description	77
2. Discussion	77
3. Survey Data	78
4. Identified Problems	78
5. Identified Plans	79
6. Level Of Participation	79
7. Level Of Understanding	79
8. Level Of Agreement	79
9. Conclusions	79
C. Voice Value-Added Services	80
1. Description	80
2. Discussion	80
3. Survey Data	80
4. Identified Problems	81
5. Identified Plans	81
6. Level Of Participation	81
7. Level Of Understanding	81
8. Level Of Agreement	81
9. Conclusions	81
D. Voice Messaging	82
1. Description	82
2. Discussion	82
3. Survey Data	84
4. Identified Problems	84
5. Identified Plans	85
6. Level Of Participation	85
7. Level Of Understanding	85
8. Level Of Agreement	85
9. Conclusions	85
E. Text Messaging	86
1. Description	86
2. Discussion	86
3. Survey Data	87
4. Identified Problems	88
5. Identified Plans	88
6. Level Of Participation	88
7. Level Of Understanding	88
8. Level Of Agreement	88
9. Conclusions	89
F. Business Graphics	89
1. Description	89
2. Discussion	89
3. Survey Data	91
4. Identified Problems	91
5. Identified Plans	91
6. Level Of Participation	91
7. Level Of Understanding	91

	<u>Page</u>
8. Level Of Agreement	91
9. Conclusions	91
G. Image Communications	92
1. Description	92
2. Discussion	92
3. Survey Data	93
4. Identified Problems	93
5. Identified Plans	93
6. Level Of Participation	93
7. Level Of Understanding	93
8. Level Of Agreement	93
9. Conclusions	95
H. Facsimile	95
1. Description	95
2. Discussion	95
3. Survey Data	96
4. Identified Problems	96
5. Identified Plans	97
6. Level Of Participation	97
7. Level Of Understanding	97
8. Level Of Agreement	97
9. Conclusions	97
I. Teleconferencing	97
1. Description	97
2. Discussion	98
3. Survey Data	99
4. Identified Problems	99
5. Identified Plans	99
6. Level Of Participation	99
7. Level Of Understanding	99
8. Level Of Agreement	99
9. Conclusions	100
J. External Data Bases	100
1. Description	100
2. Discussion	100
3. Survey Data	100
4. Identified Problems	101
5. Identified Plans	101
6. Level Of Participation	101
7. Level Of Understanding	101
8. Level Of Agreement	101
9. Conclusions	101
K. Simplified Access To Computer Facilities	102
1. Description	102
2. Discussion	102
3. Survey Data	102
4. Identified Problems	103
5. Identified Plans	103
6. Level Of Participation	103
7. Level Of Understanding	103

	<u>Page</u>
8. Level Of Agreement	103
9. Conclusions	103
L. Multimedia Communications	103
1. Description	103
2. Discussion	104
3. Survey Data	105
4. Identified Problems	105
5. Identified Plans	106
6. Level Of Participation	106
7. Level Of Understanding	106
8. Level Of Agreement	106
9. Conclusions	106
M. Integrated Filing	106
1. Description	106
2. Discussion	107
3. Survey Data	108
4. Identified Problems	109
5. Identified Plans	109
6. Level Of Participation	109
7. Level Of Understanding	109
8. Level Of Agreement	109
9. Conclusions	109
N. Desk-To-Desk Multimedia Teleconferencing	110
1. Description	110
2. Discussion	110
3. Survey Data	111
4. Identified Problems	111
5. Identified Plans	111
6. Level Of Participation	111
7. Level Of Understanding	111
8. Level Of Agreement	111
9. Conclusions	112
O. Intracity Communications	112
1. Description	112
2. Discussion	112
3. Survey Data	114
4. Identified Problems	114
5. Identified Plans	114
6. Level Of Participation	114
7. Level Of Understanding	114
8. Level Of Agreement	114
9. Conclusions	114
P. Intrabuilding Communications	115
1. Description	115
2. Discussion	115
3. Survey Data	118
4. Identified Problems	118
5. Identified Plans	118
6. Level Of Participation	118
7. Level Of Understanding	118

	<u>Page</u>
8. Level Of Agreement	119
9. Conclusions	119
Q. Computerized PBX Systems	119
1. Description	119
2. Discussion	119
3. Survey Data	121
4. Identified Problems	121
5. Identified Plans	121
6. Level Of Participation	122
7. Level Of Understanding	122
8. Level Of Agreement	122
9. Conclusions	122
R. Wideband Intrabuilding Networks	122
1. Description	122
2. Discussion	123
3. Survey Data	124
4. Identified Problems	124
5. Identified Plans	124
6. Level Of Participation	124
7. Level Of Understanding	124
8. Level Of Agreement	124
9. Conclusions	125
S. Workstations	125
1. Description	125
2. Discussion	125
3. Survey Data	128
4. Identified Problems	128
5. Identified Plans	129
6. Level Of Participation	129
7. Level Of Understanding	129
8. Level Of Agreement	129
9. Conclusions	129
T. Personal Computers	129
1. Description	129
2. Discussion	130
3. Survey Data	130
4. Identified Problems	131
5. Identified Plans	131
6. Level Of Participation	131
7. Level Of Understanding	131
8. Level Of Agreement	131
9. Conclusions	131
V IMPLEMENTATION ISSUES	133
A. Compatibility	133
1. Description	133
2. Discussion	133
3. Survey Data	135
4. Identified Problems	135
5. Identified Plans	137

	<u>Page</u>
6. Level Of Participation	137
7. Level Of Understanding	137
8. Level Of Agreement	137
9. Conclusions	137
B. Solutions To The Compatibility Problems	137
1. Description	137
2. Discussion	138
3. Survey Data	139
4. Identified Problems	139
5. Identified Plans	139
6. Level Of Participation	140
7. Level Of Understanding	140
8. Level Of Agreement	140
9. Conclusions	140
C. Communications Management	140
1. Description	140
2. Discussion	141
3. Survey Data	141
4. Identified Problems	141
5. Identified Plans	143
6. Level Of Participation	143
7. Level Of Understanding	143
8. Level Of Agreement	143
9. Conclusions	143
D. Network Security	143
1. Description	143
2. Discussion	144
3. Survey Data	145
4. Identified Problems	145
5. Identified Plans	146
6. Level Of Participation	146
7. Level Of Understanding	146
8. Level Of Agreement	146
9. Conclusions	146
E. The Reliability Of Value-Added Services	146
1. Description	146
2. Discussion	147
3. Survey Data	148
4. Identified Problems	148
5. Identified Plans	148
6. Level Of Participation	148
7. Level Of Understanding	148
8. Level Of Agreement	148
9. Conclusions	148
F. The Continuance Of Obsolescent Equipment	149
1. Description	149
2. Discussion	149
3. Survey Data	150
4. Identified Problems	150

	<u>Page</u>
5. Identified Plans	150
6. Level Of Participation	150
7. Level Of Understanding	150
8. Level Of Agreement	150
9. Conclusions	150
G. Training	151
1. Description	151
2. Discussion	151
3. Survey Data	152
4. Identified Problems	153
5. Identified Plans	153
6. Level Of Participation	153
7. Level Of Understanding	153
8. Level Of Agreement	153
9. Conclusions	153
H. User Self-Maintenance	154
1. Description	154
2. Discussion	154
3. Survey Data	154
4. Identified Problems	155
5. Identified Plans	155
6. Level Of Participation	155
7. Level Of Understanding	155
8. Level Of Agreement	155
9. Conclusions	155
VI SELECTION OF EQUIPMENT AND VENDORS	157
A. Acquisition Process	157
1. A Standard Process	157
2. Key People	158
3. How Are They Selected	159
4. Relative Level Of Influence	159
B. Factors In The Acquisition	160
C. Vendor Selection	161
1. A Specific Policy	161
2. Subsequent Purchases	161
3. Compatibility Standards	162
4. Existing Vendor	162
5. Single Vendor	163
6. Support	163
D. Vendor Influence On System Designs	164
1. Description	164
2. Discussion	164
APPENDIX A: QUESTIONNAIRES	165
1. Focus Discussion Guide	165
2. Service Definitions	189
3. Post Focus Questionnaire (Forecast Survey)	193

	<u>Page</u>
4. Mail Questionnaire (Audit Survey)	201
5. Depth Interview Questionnaire	203
APPENDIX B: DATA BASE	213

OFFICE COMMUNICATION SYSTEMS

EXHIBITS

			<u>Page</u>
I	-1	Value-Added Services As Problem Solutions	2
	-2	Focused-Issue Discussion Groups	6
II	-1	Value-Added Services - Level Of Familiarity	24
	-2	Value-Added Services - Level Of Forecast Usage	25
	-3	Value-Added Services - Premiums Willing To Pay	27
	-4	1985 Office Communication Services	28
III	-1	Methods Of Measuring Office Worker Productivity	61
	-2	Methods Of Measuring Communications System Effectiveness	64
IV	-1	Voice Communications Problems - Percent Of Respondents	75
	-2	Image Communications Problems - Percent Of Respondents	94
V	-1	Data Communications Problems - Percent Of Respondents	136
	-2	Communications Management Problems - Percent Of Respondents	142
	-3	Maintenance Problems - Percent Of Respondents	156
B	-1	Focus Group Attendees - By Responsibilities	213
	-2	Focus Group Attendees - By Industry	214

I INTRODUCTION

I INTRODUCTION

A. OBJECTIVES OF THE STUDY

- The primary purpose of this study is to survey the marketplace, ascertaining customer needs for communications equipment in the office environment.
 - This study was defined in the original contract document signed by BNR and INPUT and dated May 29, 1981.
 - The study represents an expanded version of the original proposal from INPUT, dated May 19, 1981.
 - The study is further expanded in an addendum to the contract referred to as the "Background Document."
- The primary purpose stated in the Background Document is to identify existing communications problems in selected market segments and to determine the extent to which certain listed and other potential value-added services are perceived to be solutions to the problems.
 - The Background Document list of those value-added services is shown in Exhibit I-1.

EXHIBIT I-1

VALUE-ADDED SERVICES AS PROBLEM SOLUTIONS

- Speed code and protocol conversation for data communications
- Voice messaging
 - Call forward
 - Call forwarding
- Data (text) messaging
- Electronic filing
- Image (facsimile) communications
 - Real time interactive
 - Messaging (store and forward)
- Communications management
 - Small moves and changes, LCR, CDR
- Private networking features of controller
- Conferencing
 - Voice
 - Voice and data
 - Voice and image
 - Video
- Provision of transparent access to data bases
 - Mediation
 - Auto log-on
- Provision of on-line corporate directory service including names, titles, telephone numbers, and other administrative information
- Provision of communications between different models of word processors

- The three principal objectives defined in respect to ascertaining customer needs for communications equipment, as set forth in INPUT's proposal, were:
 - To identify a set of requirements for office communications systems based upon the functions and forces interacting within the business environment.
 - To develop these office communication systems requirements in such a way as to reflect the growing interrelationships between various functional systems such as voice, data, message, electronic mail, filing, dictation, etc.
 - To develop an understanding of the acquisition processes where changes are made in office communications systems.
 - This includes a definition of the financial or budgetary process as well as the systems change process.
 - It also includes the organizational make-up involved in influencing changes.
- The primary objectives of identifying existing communications problems in selected market segments were:
 - To identify customers' future communications plans.
 - To identify communications-related problems in existing communications systems and practices.
 - To determine attitudes toward and interest in obtaining specific solutions to their communications problems.
 - The potential solutions are enumerated in Exhibit I-1.

- To rank each solution and evaluate its perceived value, likely time of adoption, and anticipated usage.

B. METHODOLOGY

- The study employed four different research methodologies as follows:
 - Focused-issue discussion groups.
 - Guided forecast questionnaires.
 - Mail audit questionnaires.
 - In-depth personal interviews.
- Each of these methodologies was intended to address a different aspect of the study.
 - The discussion groups addressed users' plans for implementing future systems.
 - The forecast questionnaires defined the timeframe for these future systems.
 - The audit questionnaires provided quantitative data on users' information installations and users' estimates of the magnitude of various problems.
 - The in-depth interviews provided insight into users' processes for acquiring systems from vendors.

- Twenty-two focused-issue discussion groups were held between July 13 and August 25, 1981, with videotaped presentations on topics, as shown in Appendix A (Focus Discussion Guide and Service Definitions).
 - Two hundred and two individuals attended these sessions.
 - The distribution of responsibilities is included in Appendix B.
 - A list of cities is shown in Exhibit I-2.
 - All sessions were taped and 11 were recorded on video with the attendees' knowledge.
 - The results were annotated and summarized by INPUT.
- The guided forecast questionnaires were given to the attendees of the focused-issue discussion groups to obtain their estimates of the timing and extent to which certain new systems and services may be implemented in their companies.
 - This questionnaire is included in Appendix A (Post Focus Questionnaire (Forecast Survey)).
 - Approximately one-half of the attendees completed these questionnaires.
- The mail audit questionnaire, shown in Appendix A (Mail Questionnaire (Audit Survey)) was mailed to over 2,000 communication managers, data processing managers, and office automation managers in large companies in the United States and Canada.
 - As of this writing, a total of 92 responses have been received.

EXHIBIT I-2

FOCUSED-ISSUE DISCUSSION GROUPS

CITIES OF SESSIONS

New York, New York

Toronto, Canada (four groups)

Houston, Texas

Philadelphia, Pennsylvania

Boston, Massachusetts

San Francisco, California

Los Angeles, California

Montreal, Canada

Saddle Brook, New Jersey (New York City)

Chicago, Illinois

- Thirty-one of these were obtained by telephone in a follow-up mode which enabled a cross-check against a sampling bias among the non-respondents.
- There were some special differences but no overall biases.
- Fifteen organizations, all of which were represented in the focused-issue discussion groups, were interviewed in the in-depth personal interviews.
- There were multiple interviewees in each instance.

C. ANALYSIS AND CONCLUSIONS

- The results of this data gathering were reviewed and analyzed by INPUT's project team and conclusions drawn relative to the original objectives of the study.
- This report plus the magnetic tapes of the raw survey data constitute the results of the study.
- The following section provides an Executive Summary of the results.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- The major conclusions in this Executive Summary are consistent with the objectives of the study which were described in the Introduction.
 - They are organized into subsections on existing systems and requirements, communications-related problems, planning, customer attitudes toward a set of systems or equipment which may be offered to assist in business communications, and the acquisition process.
- Some major observations are listed below, followed by the subsections just defined.

A. MAJOR CONCLUSIONS

- Planning of office communication systems is a fragmentary and occasional process.
 - Few of the companies interviewed have a formal continuous process for planning of communication systems of any kind.
 - The planning of office communication systems is found in the functional groups such as voice, data, office automation, and also among the local entities.

- Frequently, the local office manager has responsibility for operating as well as planning any communication systems within and around his office.
- The planning that is being done emphasizes short-term, high-flexibility solutions.
 - Because most of the companies are concerned with the rapid change of technology and their present lack of understanding of the existing technology, they are not making long-term commitments.
 - The plans are for short periods of time (two to three years) and high flexibility such as leaving extra room in duct space for future cabling.
- Interfacing between systems (e.g., word processing to data processing) is recognized clearly as an important existing requirement.
 - There are a number of different systems which generate information which is needed by other systems.
 - . The most obvious example is that of word processing and data processing.
 - . Word processing systems obtain financial data from the computer and convert this data into clean financial reports.
 - Other interface requirements exist between various data processing systems, such as the order entry and production control systems.
- Integration among systems (e.g., voice and data) is only recognized vaguely as a potential future benefit.

- Actual sharing of facilities (as opposed to interfacing between systems) is recognized as a difficult, technical challenge with some presently unclear benefits.
- One key area of possible integration is that of voice and data systems either within the building, over long distances, or on a user workstation.
- While the participating companies recognized that there is probably some cost reduction and other advantages which may accrue, they are not enthusiastic about tackling the potential problems in such integration.
- The focal point for planning of future office communication systems will be the workstation.
 - The workstation is expected to undergo the greatest change in capability in the near future.
 - The respondents believe that this is where vendors will place the greatest emphasis by reason of the large potential revenue.
- Users are adopting a "wait and see" attitude toward the implementation of intrabuilding communication networks.
 - With specific emphasis on the intrabuilding networks such as data PBXs and wideband transmission systems such as Ethernet, the users are, at this point, seeing the inadequacies of these proposed solutions and are anticipating significant improvements.
- Office communication systems are more susceptible to human factors than are most information systems.

- A primary consideration about office communication systems is that they are going to be used by people for whom communication is only a part-time, peripheral activity.
- The users are not going to be as extensively trained for such an occasional activity as would, for example, a data entry operator or a reservations clerk.
- These users are going to be performing the same functions which they have always performed except using a different and, to them, questionably better set of tools.
- The growing requirement for network reliability is not being adequately met by vendors.
 - As companies become more dependent on communications networks to perform some of their basic business operations, the requirement for reliability of those networks grows.
 - Users do not see a similar growth in the improvement of reliability of communications services.
 - Leased lines are as subject to failure today as they were 10 years ago, for example.
 - The users feel forced to take on an increasing amount of responsibility for insuring the reliability of their own networks.
- The following section of the Executive Summary defines existing systems and practices reported by participants of the study.

B. EXISTING COMMUNICATIONS SYSTEMS AND PRACTICES

- Voice systems are largely taken for granted by both companies and individual users.
 - User experience with voice systems has been simply that they are always there.
 - The almost 100% reliability of voice systems is assumed by users.
 - Operations and applications on voice systems are a matter of total transparency.
 - New technology coming into the area of voice systems, such as voice store and forward services, is bringing attention to the need to understand the applications.
 - For example, in voice store and forward services, the question is raised: "How long or complex a message can be reasonably handled on a voice store and forward service?"
 - The extensive level of acceptance of computerized PBXs is not a contradiction.
 - These computerized PBXs are being acquired for cost reduction purposes and not for improved functionality of the systems.
 - The cost reductions include least-cost routing, simplified moves, end user department chargeback capabilities, etc.
- Data networks are expanding in all dimensions.

- In addition to expanding on a companywide basis, data networks are expanding within the major buildings of the company and are expanding in terms of the number of terminals, the number of applications, and in the integration of applications on those networks.
- The growth of data terminals within buildings is dramatic.
 - . Today there is one terminal for every eight employees.
 - . By 1985, users expect there will be one terminal for every four employees.
- Most of these data terminals are already handling a number of functions including data and message-type functions.
- In most large companies, the data networks are converging on some IBM data communication standards, most commonly, SNA.
- Electronic mail systems are being implemented now on data networks.
 - A significant percentage of the companies already have an electronic mail system, and most will have such a system by 1985.
 - These systems are usually implemented by and for information organizations, but the user base is being expanded to other organizations as well.
 - Most of these systems are single-node operations tied to one main-frame.
 - . Most often there are remote terminals attached to that main-frame.

- . Most of these systems will, however, be converted to multiple mainframe systems in multiple locations by the mid-1980s.
- Facsimile installations are static at this time.
 - While the responses from the participants in this study indicated little or no growth in facsimile, facsimile networks are growing rapidly in large companies.
 - . The discrepancy is attributable to the fact that facsimile networks are usually not under the control of the communication staff organizations who were the primary subjects in this study.
 - High-speed facsimile, that is under one minute, is growing rapidly but from a very small base.
 - Special graphic communications, such as the transmission of maps and engineering drawings, are growing in unique organizations, such as municipal governments and geological operations.
- Management of communication systems is a highly distributed responsibility.
 - The management of voice and data communication systems is normally a separate responsibility in most organizations, and much of the office communication responsibility resides with a quite independent local office manager.
- Based upon the responses of participants in the study, INPUT defined their major communications problems in the following section of this Executive Summary.

C. COMMUNICATIONS-RELATED PROBLEMS

- The major communications-related problems include compatibility, maintenance, reliability, and effective utilization of existing equipment, as discussed below.
- As the need grows for interfaces between different systems, the problem of compatibility also grows and has now become a major problem for most companies.
 - In spite of the effort to standardize on a limited number of device communication protocols, the varied types of equipment continue to cause problems and will continue to cause problems for the foreseeable future.
 - An especially critical interface compatibility problem is that of communicating word processors.
 - The growing interface requirements for connecting word processors to data processing systems and to other types of word processors present a particularly difficult compatibility problem.
- Maintenance has always been a problem for distributed communication networks and it continues to be so.
 - Maintenance grows as a problem primarily because of the increasing complexity of the equipment and the declining capability of the people, both vendor personnel and in-house personnel, to maintain that equipment.
 - A particular problem which companies attempt to avoid or reduce is the multiple vendor "finger pointing" problem in which vendors will not accept responsibility for a particular failure situation.

- The need for higher network reliability was important to participants in this study because many applications are being implemented on communication facilities which had previously been handled by some physical process such as mail.
 - For example, multilocation electronic mail systems are now being implemented in many companies.
 - In addition to the growing dependence on this communication network, the backup systems, usually the predecessor manual operations, are themselves atrophying for lack of use and are ceasing to be viable backup systems.
 - This need for improved reliability is particularly important in those industries which have high-speed turnaround requirements for customer service.
 - Such industries include the insurance industry for claims processing and the banking industry for all of the new on-line banking services being provided to customers.
 - These new reliability requirements are not restricted to the customer service applications themselves but to many other peripheral or support applications within the same organization.
- Many of the new capabilities being offered by communication services and products are so complex that extensive training is required to introduce the capabilities to the end users.
 - Therefore, these capabilities are not being used effectively.
 - In addition, many of these new capabilities have been implemented in a way that presents a psychological barrier to the end user (e.g., multiple key sequences to perform functions such as call transfers).

- The following section summarizes the major issues and findings on the planning process at participating companies.

D. FUTURE COMMUNICATIONS PLANS

- Only a few of the very largest companies have any kind of a future communications plan.
 - Long-range communication plans, which are coordinated with the company's strategic plan, including technological change, company growth, and other systems, were rarely found in the companies studied.
 - Most companies treat communications as a service which is reactive to present requirements.
- Most companies do have informal communications growth forecasts and plans for specific projects.
 - Although companies do not have comprehensive plans, they do have a reasonably good feel for the potential growth of different kinds of systems in terms of the number of terminals, lines, traffic volume, etc.
 - For the most part, these growth forecasts are an extrapolation from prior experience with a small amount of input from new systems being implemented.
 - Companies also have fairly detailed specific project plans for projects such as PBX replacement, new data communication protocol conversions, and specific improvement projects.

- New buildings, which often create opportunities for new kinds of communications, are also not usually treated as a planned system development.
- . There are exceptions, however.
- There are three principal inhibitors to communications planning.
 - The rate of change of technology obsoletes plans quickly.
 - Communication responsibility is usually fragmented among many groups (voice, data, office administration, local managers, etc.).
 - Communications staffs, especially in voice communications, are usually understaffed and often underqualified.
- Users expect high growth in the following equipment and communications systems.
 - Internal data terminals.
 - . These are terminals on the corporate data communication network located in an office building.
 - . The important characteristic is that these terminals often handle multiple applications and are found as individual units at professional and junior management workstations.
 - Communicating word processors (CWP).
 - . A significant portion of the growth of CWPs is in the addition of communication capability to word processors which are already in place.

- However, significant growth is expected in all types of word processors.
- Electronic mail systems.
 - The growth here is both in the number of accessing devices, usually data terminals, and in the number of accessing locations, that is, distributed locations outside the building.
- Voice store and forward systems.
 - The expected growth in this area is practically all potential growth in that very few of these systems are in place today.
- Business graphics terminals.
 - Many of the data terminals to be installed at the locations of professional employees are going to have business graphics capabilities, usually with color.
- Users have frequent project plans for the following:
 - Computerized PBXs.
 - PBXs are rarely installed on a simultaneous, multiple location basis.
 - Each location is treated as a more or less independent project often with different vendors for each.
 - However, there appears to be a tendency to standardize on one major vendor such as Rolm or Northern Telecom.
 - CWP to data processing interfaces.

- Because of the complexity of this growing interface, a number of users have developed project plans for putting together the necessary hardware and software to allow specific types of CWP's to interface with their data processing system.
 - Usually this is a Wang CWP communicating with an IBM computer.
 - Teleconferencing facilities (not necessarily video).
 - Recognizing the continuing growth in airline fares and other travel difficulties, many companies are putting projects in place to establish teleconferencing facilities.
 - Often these teleconferencing facilities are basically speaker-phone-equipped rooms.
 - Often, these have a facsimile and, sometimes, a computer teleconference aid.
 - In almost all cases, users have some contingency plan for future incorporation of video into this facility, but most are being cautious on video teleconferencing because of the anticipated cost.
- Users have interest but do not have plans or forecasts for the following:
 - Intrabuilding communication networks.
 - While a number of users are experimenting with such networks and almost all users are paying close attention to the multiple technologies, no users have any specific plans for implementing any operational intrabuilding communication network.

- Integrated voice and data networks.
 - . Again, users are paying close attention to the technology and giving thought to the potential benefits but are not making commitments to such facilities.
- Integrated workstations.
 - . At the present time, users are simply reacting to end user demand for more terminals of various types at workstation locations.
 - . Many users can recognize the potential advantages of integrating additional functions at a workstation.
 - . However, few see clearly any significant advantages to integration of functions at a workstation or any existing equipment which could perform such integrated functions.
- While users recognize and are concerned with some security problems, such as password and WATS line access, they are much less concerned with the interception of transmissions.
 - There are a very few exceptions in the data communications area.
 - The only exceptions in the voice area are on some international circuits to unstable areas of the world.

E. CUSTOMERS' ATTITUDES TOWARD SPECIFIC SOLUTIONS

- The 12 issues provided to INPUT by the client, which are listed below, represent a combination of problems, systems, and equipment which may be facing customers or may be offered to customers as "solutions" to problems.

- An example of a problem is speed code and protocol conversion, while a system may be electronic mailing, and equipment, the facsimile machine.
- Customer attitudes toward these 12 items, which may or may not be solutions to the communications-related problems discussed previously, are described below.
 - Audit survey data relating to these issues is found in Exhibits II-1, II-2, and II-3. Forecast survey data on these issues is found in Exhibit II-4.

I. SPEED CODE AND PROTOCOL CONVERSION FOR DATA COMMUNICATIONS

- Users prefer a defined standard interface (usually IBM) to which all approved vendors adhere.
 - Users recognize the constraints which this places them under for future kinds of vendor and new product flexibilities, but it remains their preference.
- Introduction of a third-party vendor of a value-added service is undesirable and would only be used for urgent situations.
 - Any solution which increases the number of vendors with whom the user must deal is inherently undesirable.
- The use of a black box interface is undesirable from a number of points of view:
 - First, the addition of a third-party vendor.
 - Second, the expansion of the number of devices to be installed, controlled, and maintained.

EXHIBIT II-1

VALUE-ADDED SERVICES - LEVEL OF FAMILIARITY

SERVICE	PERCENT OF RESPONDENTS WHO CLAIM FAMILIARITY	RANK
A. Speed, Code, Protocol Conversion for Data Terminals	55%	12
B. Speed, Code, Protocol Conversion for Communicating Word Processors	52	13
C. Voice Messaging (Store and Forward)	70	5
D. Data/Text Messaging (Store and Forward).	73	3
E. Store and Forward Facsimile	67	7
F. High-Speed, High-Resolution Facsimile	59	11
G. Integrated Data, Text, Graphics Filing	50	14
H. Video Conferencing Conference Room	83	1
I. Video Conferencing Desk to Desk	68	6
J. Single Button Access to Data Bases	33	16
K. On-Line Corporate Directory	61	10
L. Security and Encryption Features on Telephones	71	4
M. Security and Encryption Features on Data Networks	74	2
N. PBX Based Local Area Network	64	9
O. Coax Cable Local Area Network	65	8
P. Computer or Graphics Aided Teleconferencing	47	15

EXHIBIT II-2

VALUE-ADDED SERVICES - LEVEL OF FORECAST USAGE

(PERCENT OF COMPANIES USING)

SERVICE	TODAY	1982	1983-1985	BEYOND 1985	TOTAL	RANK
A. Speed, Code, Protocol Conversion for Data Terminals	42%	3%	8%	0	53%	3
B. Speed, Code, Protocol Conversion for Communicating Word Processors	21	18	12	6%	57	2
C. Voice Messaging (Store and Forward)	9	4	25	8	46	4
D. Data/Text Messaging (Store and Forward).	37	2	18	6	63	1
E. Store and Forward Facsimile	11	2	11	7	31	13
F. High-Speed, High-Resolution Facsimile.	10	8	8	10	36	11
G. Integrated Data, Text, Graphics Filing	15	3	21	3	42	7
H. Video Conferencing, Conference Room	11	7	18	7	43	6

Continued

EXHIBIT II-2 (Cont.)

VALUE-ADDED SERVICES - LEVEL OF FORECAST USAGE

(PERCENT OF COMPANIES USING)

SERVICE	TODAY	1982	1983-1985	BEYOND 1985	TOTAL	RANK
I. Video Conferencing, Desk to Desk	2%	0	5%	2%	9%	16
J. Single Button Access to Data Bases	18	0	10	4	42	8
K. On-Line Corporate Directory	8	3%	8	5	24	15
L. Security and Encryption Features On Telephones	13	2	2	9	26	14
M. Security and Encryption Features On Data Networks	18	2	10	8	38	8
N. PBX Based Local Area Network	19	0	14	5	38	10
O. Coax Cable Local Area Network	28	0	10	6	44	5
P. Computer or Graphics Aided Teleconferencing	6	10	19	0	35	12

EXHIBIT II-3

VALUE-ADDED SERVICES - PREMIUMS WILLING TO PAY

SERVICE	PERCENT OF COMPANIES WILLING TO PAY ANY PREMIUM	AVERAGE PREMIUM PERCENT	PERCENT OF COMPANIES WILLING TO PAY 20% PREMIUM
A. Speed, Code, Protocol Conversion for Data Terminals	42%	9%	8%
B. Speed, Code, Protocol Conversion for Communicating Word Processors	59	12	15
C. Voice Messaging (Store and Forward)	39	10	7
D. Data/Text Messaging (Store and Forward)	40	8	6
E. Store and Forward Facsimile	23	8	2
F. High-Speed, High-Resolution Facsimile	8	16	5
G. Integrated Data, Text, Graphics Filing	45	10	9
H. Video Conferencing Conference Room	31	9	5
I. Video Conferencing Desk to Desk	18	7	0
J. Single Button Access to Data Bases	55	10	4
K. On-Line Corporate Directory	20	6	0
L. Security and Encryption Features on Telephones	30	8	4
M. Security and Encryption Features on Data Networks	41	11	6
N. PBX Based Local Area Network	21	9	2
O. Coax Cable Local Area Network	26	9	2
P. Computer or Graphics Aided Teleconferencing	52	8	0

EXHIBIT II-4

1985 OFFICE COMMUNICATION SERVICES

SERVICE	PERCENT OF COMPANIES USING	PERCENT OF OFFICE EMPLOYEES USING THE SERVICE (IN USING COMPANIES)
A. Basic Desk Communications (Two Point Communication)		
Voice (Telephone)	92%	91%
Data/Text Terminals	94	39
Image	54	13
Video (at Desk)	30	17
Video (in Conference Room)	69	11
B. Desk to Desk Messaging (Store and Forward)		
Voice	52	60
Data/Text	79	40
Image	23	12
C. Desk to Desk Multi-Media Conferencing (Three or More People)		
Voice and Data/Text	46	30
Voice and Image	22	25
D. Electronic Filing and Retrieval		
Voice	26	46
Data/Text	83	46
Image	31	17
E. Special Services		
On-Line Directory	71	52
Simplified Data Base Access	28	34
Voice Encryption	22	5
Data Encryption	46	25
Speed, Code, and Protocol Conversion:		
For Data Terminals	61	43
For Communicating Word Processors	74	43

- Third, the wide range of optional interfaces which would be involved.

2. VOICE MESSAGING (CALL FORWARD, CALL "ANSWERING")

- Voice messaging is a highly regarded potential service or system. The users have two reasons for regarding voice messaging favorably.
 - First, they see voice as being a natural interface which would require less training and would gain faster acceptance on the part of users and, particularly, management level users.
 - Second, they see the voice messaging capability solving a number of operational problems, specifically, the "telephone tag" process which users experience with existing telephone systems.
- Given some defined improvements over existing systems, users would be willing to pay a substantial premium for voice messaging.
 - The defined improvements include message waiting notification, time of arrival stamp, and "same extension number service."

3. DATA TEXT MESSAGING

- Many companies are now implementing data text messaging systems on existing in-house systems, usually a data communication network.
 - These systems, as noted earlier, are usually designed by and for the information services department and have been expanded in many companies to include other users.
 - These electronic mail systems usually begin with a single computer in a single location and expand using the same computer but serving remote locations.

- A few are now adding multicomputer or multinode capability to interchange messages among data communication networks.
- Multinode systems are among the applications requiring interfacing capabilities.
- Many companies would favor a service offering, especially for multinode systems.
 - While the electronic mail systems of many of these companies are very sophisticated, there are a number of reasons why a service offering might be acceptable to these companies.
 - . A primary reason would be the off-loading of an application from an otherwise crowded data processing system.
 - . Another reason would be the higher reliability which might be obtainable from a service vendor, particularly for systems involving long-distance transmission facilities.

4. ELECTRONIC FILING

- Although users could perceive many advantages to storing and retrieving information in many media, few could forecast probable implementation.
 - Integrated electronic filing, like most integrated applications, was difficult to visualize both in terms of the applications, the probable implementation, and, most of all, the user training and indoctrination which would be required to achieve an acceptable level of usage.

5. REAL TIME INTERACTIVE IMAGE (FACSIMILE) COMMUNICATIONS

- The participants in this study were biased against facsimile.

- In general, their feelings were that facsimile is an inelegant and disorganized solution and not likely to be anything other than a short-term solution to more basic communication problems.
- These participants' views are in conflict with known information about the acceptance of facsimile within large companies.
- Facsimile growth is in the hands of the end user organizations in most companies and will continue to grow in spite of the central communications staffs.
 - Most of the existing facsimile networks have been bought by sales organizations, manufacturing departments, etc., without the review and often the knowledge of the central communication staffs.
 - Facsimile acquisition, like so many other small equipment purchases, is largely out of control from the point of view of the corporate communications managers.

6. MESSAGING (STORE AND FORWARD) IMAGE (FACSIMILE) COMMUNICATIONS

- Facsimile compatibility is a significant problem in large companies.
 - Because of the ways in which these various facsimile devices have been implemented in companies, there is a wide range of types and generations of devices in place which are incompatible.
 - Often these problems bring the existence of facsimile to the attention of the communications managers who must find the solution.
- Some companies with large facsimile networks are considering store and forward for efficiency reasons; for example, reduction of busy signals.

- As facsimile networks grow, the number of stations trying to communicate to some central location such as an order desk, becomes larger than is feasible even with a multiple device capability.
- Store and forward would be a more efficient solution and some communication managers are now looking at this as a possible solution.

7. COMMUNICATIONS MANAGEMENT

- One reason companies are converting to computerized PBXs is to improve communications management.
 - While PBXs are sometimes replaced today for capacity reasons, the more common reason is the actual payoff in terms of the additional network cost savings which can be achieved with these PBXs.
 - The primary economic advantages are those of least-cost routing, the ability to simplify the station move process, and to enable the charging back of telephone costs to user departments.

8. PRIVATE NETWORKING FEATURES OF CONTROLLER

- Users believe that private networking features are now adequately available through tie lines, Centrex, CCSA, and other offerings.
 - Most users did not recognize any significant advantage to the implementation of a uniform numbering plan.
 - The use of tie lines, where the originator needs to dial 81, 82, etc. in order to access another building or a WATS line, is not regarded by users as a significant problem.
 - As one user put it, "I dial 25 numbers to use my Sprint line; a two-digit tie line access code is no big deal."

9. TELECONFERENCING

- Existing teleconferencing systems (voice) get very little use by independent companies.
 - The incentives for teleconferencing (costs and difficulties) are growing so fast that most companies are studying the alternatives.
 - Again, users are finding themselves in a mode where the requirements are somewhat ahead of the economical alternatives, particularly video conferencing.
 - Some users are, in fact, installing teleconferencing rooms with lower cost capabilities (voice) with the intent of moving to video in the future.
- Most users recognize the problem of gaining the acceptance of the ultimate users.

10. PROVISION OF TRANSPARENT ACCESS TO DATA BASES THROUGH "MEDIATION," AUTO-LOG-ON

- Automatic log-on is a highly acceptable feature, particularly in the context of simplifying another aspect of the end user interface.
 - Most companies recognize the frequently complex process of logging onto a computer facility and would find a simpler method highly acceptable.
 - A number of users, particularly those on data systems, already have a continuous log-on type facility.

11. PROVISION OF ON-LINE CORPORATE DIRECTORY SERVICE INCLUDING NAMES, TITLES, TELEPHONE NUMBERS, AND OTHER ADMINISTRATIVE INFORMATION (OTHER SERVICES - MAIL, FACSIMILE, PARCELS)

- Subject to the requirement of a user terminal capable of entering and displaying the required information, an on-line corporate directory service would be highly acceptable.
 - The only way users can envision utilizing such a directory service would be through a device such as a Display Phone.
 - It would carry a relatively low premium.
- Some users would have the service go further and place and manage the call.
 - This would include the automatic redialing.
- All users recognize the problem of high turnover of employee locations which necessitates some kind of an automated data base.
 - The only questions about this directory data base related to its on-line capability.

12. PROVISION OF COMMUNICATIONS BETWEEN DIFFERENT MODELS OF WORD PROCESSORS

- Communications between word processors is an extremely urgent requirement in most companies and carries a high premium.
 - Like facsimile, word processors have grown rapidly, uncontrolled by the central communications staff.
 - As such, there are, in most companies, a wide range of incompatible word processors with an increasing need for communication.

- The interface between word processing and data processing systems is also an important value-added service.
 - A number of word processor applications are requiring the use of data obtained from the corporate computer system.
 - An example is the preparation of financial reports.
 - This word processing/data processing interface is less difficult than the interface between word processors.

F. ACQUISITION PROCESS FOR COMMUNICATIONS

- Communications products and services are acquired in the same manner as other capital expenditures.
 - Most commitment expenditures of any kind require some level of review.
 - The higher the value, the higher the level of review.
 - Local authority is in the range of \$10,000-30,000 in most companies.
- The acquisition process can be initiated either by a centralized staff function or by an end user department.
 - The extent of the initiation by central staff correlates very closely with the level of planning in the organization.
 - In a relatively unplanned communication structure, the central staff would be primarily an administrator of long-distance communication facilities or a technical advisor.

- In general, voice systems are initiated at a lower level in most companies than are data systems.
- The initiator is by far the key influence in the acquisition.
 - His personal credibility or clout is the primary decision criteria for management.
 - On numerous occasions it was pointed out that individuals who, either by reason of their prior performance on implementing successful projects or by reason of being a senior executive in the company, have what amounts to a carte blanche to implement new kinds of communication capabilities.
 - Technical, financial, and management reviews possess varying levels of veto power.
 - The technical review is primarily one of compatibility and potential obsolescence.
 - The financial review is in the nature of tax and method of financing; it also has significant power where fiscal cash situations are in question.
 - Management reviews obviously have the primary veto power, but it is at the management level where the influence comes back to the personal credibility of the initiator mentioned above.
- Justifications are usually performed, sometimes extensively, but were treated more as an "issues checklist" for the initiator rather than a basis for decision.
 - The justification processes are identical regardless of whether the product being reviewed is a communication capability, a computer capability, a new machine tool, or any other major expenditure.

- Vendors have significant levels of influence over end user initiated acquisitions; little influence over central staff initiated acquisitions.
 - Vendors have this higher level of influence at the end user level because of the relatively low level of sophistication of the end users in the technology of many of these communications products.
 - Central staff, on the other hand, tends to be more qualified technically and attempts to exert some standardization over the various products and, therefore, the vendors which are acceptable only on a corporate-wide basis.
- Companies do not have written policies on vendor preference but favor the minimum number of "standard" vendors, namely IBM and AT&T, wherever possible.
 - Whether the purchase is the first, an add-on, or an update purchase, the preference, particularly of central staff-initiated acquisitions, will be for the "standard" vendors.
 - The primary reason for this is that of standardization for interfacing and similar purposes.
 - Prior experience with vendors is a significant factor.
- Acquisition factors are ranked by level of importance as follows:
 - Cost savings versus prior system.
 - Cost reduction is by far the predominant factor in most acquisitions.
 - This cost is a complete system cost not a specific product cost.

- . The economic evaluation of the PBXs mentioned earlier is a typical case in point.
- Compatibility with existing systems.
 - . Great and growing consideration is given to insuring that new systems being purchased are as compatible as possible with existing systems even at some loss of functionality.
 - . Here there is a significant difference between the end user acquisitions and the central staff acquisitions.
- Vendor support, primarily maintenance.
 - . Maintenance continues to be a key consideration.
 - . Most users also recognize other support aspects such as training, documentation availability of spares, etc.
- Prior experience with vendor.
 - . Prior experience is not necessarily at a given location but can be elsewhere in the company and can possibly be other companies' experience with the same vendor in similar circumstances.
- Tax considerations.
 - . This is an increasingly important consideration to users, given the new tax laws.
 - . This also varies from one type of corporation to another.
- Competitive prices.

- . Given equality among all other factors, the absolute prices of one vendor's product versus another vendor's product is a decision factor.
- Life cycle costs.
 - . Usually, these costs are not well understood and are not a significant consideration in any but the most sophisticated organizations.
 - . On the other hand, in some high caution acquisitions, such as the intrabuilding networks mentioned earlier, the users will give serious consideration to products which can be charged out economically in a short period of time.

G. THE REMAINING REPORT

- The following chapter, Chapter III, defines the planning process.
- Chapter IV defines user requirements for communications equipment and provides more detailed information on the 12 issues raised by the client and defined in Exhibit I-1.
- Chapter V concerns people-oriented implementation problems and addresses directly the potential solutions to communications-oriented problems such as compatibility, network security, reliability, and obsolescence.
- The final section describes the customer's process of acquiring the needed communications services and equipment.

III USER PLANNING ISSUES

III USER PLANNING ISSUES

- This section discusses the various problems, constraints, and driving forces to which the users' staffs must relate in planning future office communication systems.
- A common thread weaving through many of these planning issues, and indeed almost all of the issues related to future office communication systems, is that of the "people problem."
 - Successful planning is based upon a recognition that office communications, more than most communications, are closely related to what people do, what they will not do, and how to organize and equip people to perform office information tasks more productively.
 - The preferences, biases, and influences of key people in the office information environment are critical elements in the planning, acquisition, and implementation of office communication systems.
 - Therefore, this chapter includes discussions of organization, performance measurement, justification of acquisitions, productivity measurement, and other people-related problems which affect planning.
- Most of these same planning issues will be discussed further in the sections related to implementation and vendor and equipment selection.

A. COMPANY PLANS

I. COMMUNICATIONS PLANNING

- Only the very largest and financially stable companies have comprehensive communications plans.
 - One-third of the total companies planned.
- There are several reasons why they do not plan for communications.
 - The rate of technological change is so fast that they feel as if they are chasing a moving target.
 - The technology is complex and they do not understand it.
 - It is a low priority in almost all instances except for the very largest companies and those who are very dependent upon communications.
- Most companies have a vague concept of where they are going in communications and try to fit day-to-day decisions into this framework.
 - Therefore, many plan on a project-by-project basis.

2. SCOPE OF THE PLAN

- Those who plan do so for a period of one to two years, normally.
 - One company, the exception, planned over a five-year period.
- Most planning is done when a project, such as a new PBX system, is initiated.

3. ORGANIZATION

- Overwhelmingly, voice and data are separate organizations coming together only at a very high level.
 - That level may be the president.
 - In one instance, however, a company which will market a very sophisticated communications network, had combined voice and data under one roof.
- Few organizations have a separate function called "office automation."
 - Where it existed, it usually reported to the voice, not data, element in the company.
 - This is so because the office automation function seems more in line with the functions of voice and word processing.

4. GEOGRAPHY

- Where network planning was involved, it normally represented the entire company.
 - Plans were made for networks in several companies and each was companywide.
- One company is developing a network and using one division as a "Beta" site.
 - Still, the plan will be for the entire company, worldwide.
- Planning for office automation and PBX systems, on the other hand, was local.

5. RESPONSIBLE FOR PLANNING

- Where planning was found, it was primarily an in-house effort.
- Planning was always found only at the corporate level.
- One company used a communications expert to assist in developing the plan.
 - They were displeased with his efforts and were redoing the plan.

6. IMPLEMENTATION OF THE PLAN

- Those who developed the plan will implement it.
 - Therefore, the corporate people will implement the plans.
 - Users were to be involved in the implementation.
- EDP and voice organizations will be responsible because the companies which planned well believed that voice and data considerations must be integrated and coordinated.

7. REACTIVE VERSUS INITIATIVE ORGANIZATIONS

- Those who planned believe that their organizations were initiative or a combination of reactive and initiative.
- All others felt they were reactive as they did not plan.
 - They react because they are small organizations, because they do not plan, and because they do not understand the technology well enough to plan.

8. THE IMPACT OF NEW OFFICE BUILDINGS

- Almost all organizations have some new facility in process.
 - Few, on the other hand, had any special plans for communications.
 - They did indicate, however, that each planned for extra ducts and larger areas for wiring.
- One, with a worldwide network, has experimented with Coax but no great planning effort was made nor was the plan inclusive of new building design.
- Most companies let the electricians do the wiring as they always have.
 - One exception was a company that has approved an Ethernet project and has included specifications in its new building.

B. IMPORTANCE OF COMMUNICATIONS IN ORGANIZATIONS

I. THE LEVEL OF IMPORTANCE

- The importance of communications varied throughout the study.
 - It was critical to less than 50% who were very dependent upon voice and data.
 - All had functions that would be disrupted but to differing degrees.
- The service industries, such as banks, brokerage firms, and financial institutions, felt they would be hurt the most.
 - "Disastrous" was the term most often used.

- The importance could be directly related to the following:
 - The duration of the downtime.
 - The extent of its effect (i.e., whole company, unit, etc.).
- Voice was universally a problem but data only a problem to the service industries.

2. THE EFFECT OF NETWORK FAILURES

- The responses varied from "disastrous" to "not much."
- Service oriented businesses tended toward the "disastrous" evaluation.
- The extent of backup procedures, such as redundant equipment, was critical.
 - Manual systems, in many cases, have atrophied and dependence on communication has become paramount and singular.
 - Some companies simply do not have an alternative to their networks or major systems.
 - To these, it would be disastrous.
- A few felt they could not recover; these were the companies dealing directly with the public.

C. FOCAL POINT OF OFFICE INFORMATION SYSTEMS

I. DESCRIPTION

- Office information systems are likely to evolve with one element becoming the focal point for planning of new application installations.

- The elements involved were the workstation, intrabuilding communication network, and the central information resource.

2. DISCUSSION

- The consensus was that the workstation will be the focal point for planning and implementing future office information systems.
- While other elements (such as the central processor, the central data file, and the communication network interconnecting these other elements) are all essential ingredients to this office information system, the workstation is the primary focal point from a number of aspects.
 - The workstation, in its many forms, is the most dynamic element in the system and the one which will incorporate the most significant types of technical and operational changes.
 - The workstation is the element most closely related to the applications carried out by its operator whether that operator is a clerk, professional or technical individual, a manager, or a senior executive.
 - Therefore, the workstation, by virtue of its ability or inability to assist in the performance of those applications, is likely to have the most impact on productivity.
 - Of greatest consequence is the fact that the workstation, by virtue of sheer numbers, has the greatest revenue potential for vendors and, therefore, will have significantly more marketing and product development attention paid to it than will all the other elements of the office information systems.
- While the workstation itself will have significant independent information handling capabilities, the communication aspect will become increasingly critical to the operation of the workstation.

- The workstation will have to interface to a number of other workstations and other information sources using a variety of communication media.
- Historically, however, communications has been and is likely to continue to be further behind the other elements of office information systems both in technology and in implementation.
- A good example of the likely position of the workstation in the future office information system can be seen in the history of word processing systems.
 - These systems started as independent workstations and only later did shared systems with central processing capability and communications become a factor.
 - It was these single station, word processing devices which created the rapidly growing word processing marketplace of today.

3. SURVEY DATA

- Data terminals are now installed at a rate of one terminal per eight office employees, and will grow to one terminal for every four employees by 1985.
- While word processors with communication capability are only installed at a ratio of one per every 20, clerical/secretarial employees will be growing at a 33% annual rate in 1985.
- Over 80% of the companies interviewed expect to have a clerk-based text/data messaging system implemented by 1985 with almost one-half of the employees using it.

4. IDENTIFIED PROBLEMS

- The primary problem expressed was the difficulty of planning in an area where technology was changing so fast, and where the users' requirements are subjective and also subject to organizational change.

5. IDENTIFIED PLANS

- Generally speaking, the users' plans in this area could be characterized as cautious.
 - Experiments, pilot projects, studies, short-term commitments are all evidences of this caution.

6. LEVEL OF PARTICIPATION

- Most of the companies had opinions on the subject of how office information systems would develop in their companies.

7. LEVEL OF UNDERSTANDING

- The issues and questions raised were well understood.
- The problems and requirements for implementing such systems were usually opinions based on experiences drawn from other kinds of systems, rather than direct experience with office information systems.

8. LEVEL OF AGREEMENT

- There was a very high level of agreement that workstations would be receiving the greatest attention from both users and vendors.

9. CONCLUSIONS

- Workstations will be the focal point for planning future office information systems.

- Experiments and pilot projects will be the dominant mode of implementation for the new few years.

D. ORGANIZATION

1. DESCRIPTION

- Organizational issues, particularly those relating to control of new development, will have a significant effect on the planning and direction of office information.

2. DISCUSSION

- Throughout the discussions, the issue of the impact of the organization was evident.
 - Organizational issues will have a significant effect on the what, how, when, and even whether various types of office communication systems will be implemented in the companies represented in this study.
- The key organizational issue is the continuing separation of voice communications and data processing organizations in most companies.
 - Most companies see the ultimate combination of communications and data processing but one-half of them see this occurring some time in the future.
 - A few companies (a rough estimate would be about one-fourth of the companies contacted) have already combined the communication and data processing organizations, many of them very recently.

- Another one-fourth of the companies expect to see communications and data processing combined within the next five years.
- The primary implication of the delay in this integration of organizations is that until it happens there will be little progress made in the integration of voice and data systems either within the office or on a systematic basis over the entire corporate network.
- Another key organizational issue raised numerous times in the discussions was the relative importance of one man in an organization in providing the impetus for the development or implementation of new information system concepts in that organization.
 - Many times it was stressed that the success of a program or the justification of a new acquisition was based on the credibility or the clout which one man had developed within that organization.
 - Usually, this credibility was based either on his position within the company, for example, the president, or it was based on that man's prior performance in implementing the other successful projects.
- While many of the respondents felt that the data processing organization (or at least data processing trained people) should be in charge of office information systems, there was considerable difference of opinion on the subject.
 - Most of the respondents, including those in data processing, recognized that the data processing organizations have developed a bad reputation in their companies based on poor performance, failure to meet schedules and budgets, and lack of responsiveness to end users.
 - Some stated that the MIS people, in spite of their image as advanced thinkers, in actual fact tend to be more reactionary than people in other staff organizations.

- Most of them also recognized that data processing people have little or no concept of voice requirements.
- Other organizations, on the other hand, are not capable of, or likely to, obtain control of office information systems.
 - It was generally agreed that office administration would not control these systems.
 - While the communication department was likely to control the intra-building communications, it was felt that its control would be restricted to the building, wiring, and switching excluding the equipment, at either end of the line.
- Ultimately, most respondents foresaw the situation where office automation or office information systems would become a subset of the MIS organization.
 - This is now occurring in most of the companies and this integration will occur in all companies much sooner than the voice/data organizational integration.

3. SURVEY DATA

- Only 6% of the respondents with data processing responsibility also had responsibility for voice operations.
- Fifteen percent of the respondents with data processing responsibility also had responsibility for some kind of office automation, usually word processing.
 - Based on other comments, this office automation responsibility was usually local only, and did not extend to the entire organization.

4. IDENTIFIED PROBLEMS

- The lack of integrated (that is voice and data) organization will be a major obstacle to integration of voice and data networks.

5. IDENTIFIED PLANS

- Plans were not identified, only trends in organization.

6. LEVEL OF PARTICIPATION

- Relatively few people were willing to discuss the inadequacies of their organizations.

7. LEVEL OF UNDERSTANDING

- Both in the specific discussion of organizational issues and in discussion of other topics, it is clear that people tend not to understand other organization problems.

8. LEVEL OF AGREEMENT

- There was a high level of agreement on the problems caused by organizational issues.
- There was little agreement across groups on the probable solutions or plans.

9. CONCLUSIONS

- Organizational considerations, more than most other considerations, represent an obstacle to the implementation of advanced, integrated office systems.

E. PERFORMANCE MEASUREMENT

1. DESCRIPTION

- This subject addresses the process by which companies measure the performance of their information system components, particularly people and communication networks.
 - The effect of performance measurement on planning is discussed as well.

2. DISCUSSION

- The measurement of performance of either people or of systems was a subject to which few of the participants could relate in any clear fashion.
- Most of the performance measuring schemes or applications described boiled down to a comparison of an existing or a new situation with a prior situation.
 - In other words, it is the measurement of a change or a trend.
 - It is not an absolute measure of performance.
- In only one case was a specific performance measuring system described and that was the measurement of the staffing of a new system as compared with the number of employees reduced by that system.
- Measurements, if made, are usually intended for justification of change.
 - In most cases, the changes to be justified are future changes, but, in many cases, the measurements are made to justify a change already made.

- A point made frequently was that performance measurement of a system or a project is in fact intended by management to be more a measure of the project manager.
- Performance requirements are often written into equipment specifications but in most cases are not in fact measured.

3. SURVEY DATA

- Less than half of the companies have any formal measurements applied to the office or communication systems.
- Of the one-half which do not measure performance, about one-third plan to perform such measurement in the future.

4. IDENTIFIED PROBLEMS

- The measurement process itself is:
 - Difficult to define or plan.
 - Usually much narrower than the real objectives.
 - More expensive than can be justified.

5. IDENTIFIED PLANS

- Performance measurement plans fall into two categories:
 - Measurements of a relatively narrow scope such as response time.
 - Measurements of very broad issues such as the ratio of professional to clerical employees.

6. LEVEL OF PARTICIPATION

- The level of participation is high.

7. LEVEL OF UNDERSTANDING

- Management is anxious to put quantitative measurements on performance.
- However, there is little understanding or contribution of useful concepts on how to do it.

8. LEVEL OF AGREEMENT

- The level of agreement is also high.

9. CONCLUSIONS

- Most of the performance measurements which are used measure changes in performance over time rather than absolute performance.
- Performance measurement is a "holy grail" which will be constantly pursued and not discovered by generations of management.

F. JUSTIFICATION OF ACQUISITIONS

1. DESCRIPTION

- This section describes the basis on which organizations justify the acquisition of new equipment or systems and the differentiation of these justifications by types of equipment.

2. DISCUSSION

- Most respondents' companies apparently regard the subject of justification much more seriously and formally than the measurement of performance.
- Most equipment or system acquisitions require some form of justification even if the justification data is relatively soft.
- The level of justification depends very heavily on the size of the acquisition.
 - The larger the acquisition the more effort spent on justification.
 - There was some level of agreement on \$10,000 being a "magic number" for formal justification.
 - In some of the companies, acquisitions up to the \$30,000 level are made with local authority and little formal or at least centralized justification.
- Usually, on large acquisitions, a pilot project is utilized to be the justification for the full implementation.
 - Justification of the pilot project itself usually comes down again to that one individual who is going to pay the bill based on guts or clout.
- Many of the respondents stated that the significant effort spent on justification is usually more than the possible savings on the acquisition would be worth.
 - This statement should be qualified in that the discussion participants were the ones performing the justifications.

- Many of the participants believe that regardless of the effort spent on justification, ultimately management bets on the prior performance of the people involved in the acquisition.
- This correlates very well with the earlier point made that the performance measurement is primarily that of the project manager and not of the project itself.

3. SURVEY DATA

- There was no survey data on this issue.

4. IDENTIFIED PROBLEMS

- The effort required for justification is usually significant.
- There are few measurement standards against which to perform any justifications.

5. IDENTIFIED PLANS

- No companies had any plans to change their justification procedures.

6. LEVEL OF PARTICIPATION

- Less than one-half of the participants had views on this subject.

7. LEVEL OF UNDERSTANDING

- The understanding of the active participants was difficult to generalize from their individual company experiences.

8. LEVEL OF AGREEMENT.

- There was good agreement on the variability of the justification process between organizations and between different situations in the same organization.

9. CONCLUSIONS

- The justification process is highly unique to each individual organization and situation.

G. MEASUREMENT OF OFFICE WORKER PRODUCTIVITY

1. DESCRIPTION

- This section describes the formal processes, if any, which organizations apply to the measurement of either productivity or changes in productivity, and the importance which organizations placed on these measurements.

2. DISCUSSION

- In most cases, the respondents believe that real measurement of office worker productivity is an elusive thing and impossible to measure economically.
 - Time studies, while capable of being done, are economically out of the question.
- In some special cases, such as a word processing center, productivity standards and relative measurements can be and usually are made.
- One respondent felt that his company was making progress by quantifying a management by objectives program.

- Many of the respondents believe that the psychology of productivity is as important as the actual measurement.
 - The examples given were the secretaries talking about the increasing amount of work done on their new word processing systems and, therefore, encouraging further implementation and utilization of what everyone intuitively believed was in fact a productive tool.
- A number of participants made the point that the big costs in an office are the costs of the managerial/professional employees and that improvement in clerical/secretarial performance would in turn be applied to improve the managerial/professional effectiveness.

3. SURVEY DATA

- Less than one-half of the companies perform any measurements of office worker productivity, as shown in Exhibit III-1.

4. IDENTIFIED PROBLEMS

- The cost of implementing and administering office worker productivity measurements usually exceeds the value.

5. IDENTIFIED PLANS

- The only plans identified were in multiple employee operations where similar functions were performed, such as word processing centers.

6. LEVEL OF PARTICIPATION

- Most of the participants had views on the subject.

EXHIBIT III-1

METHODS OF MEASURING OFFICE WORKER PRODUCTIVITY

METHOD	PERCENT OF RESPONDENTS*
Formal Production Standards	12%
Formal Standard- Limited to Specific Department	2
Manual Records	4
Automated Records	2
Unspecified	7
Under Study	6
Total	29%*

*RESPONDENTS OFTEN REPORTED MORE THAN ONE METHOD OF MEASURING OFFICE WORKER PRODUCTIVITY

7. LEVEL OF UNDERSTANDING

- Relatively few understood either the need for or the method of measuring office worker productivity.

8. LEVEL OF AGREEMENT

- The primary agreement was on the difficulty of measuring.
- There was little agreement on needs or methods of measurement.

9. CONCLUSIONS

- Office worker productivity measurements are rarely conducted today and there appears to be little pressure to change this situation.

H. MEASUREMENT OF COMMUNICATIONS SYSTEM PERFORMANCE

1. DESCRIPTION

- This section describes the measurements which organizations commonly apply to the performance of their communication networks and the validity and utility of these measurements.

2. DISCUSSION

- Most companies have performed extensive cost studies of their communication networks or at least had such studies performed for them by either the telephone companies or by consultants.

- These studies usually examined cost trends, cost of alternative systems, and costs of making network changes.
- Most respondents felt that it is difficult to get data from the telephone companies, particularly data for nationwide systems crossing operating company lines.
- Measurements more directly relevant to performance in communications relate to specific forms of performance such as missed deliveries of equipment, response times of terminals, response times of repair services, etc.
- The ultimate measurement of performance in most communication systems is the extent of end users' complaints.
 - One respondent commented that the best managed communication system is one in which communication management had a rational explanation for each user's complaint.
- One issue raised is that the real cost of operating a communication system is user man-hours which are buried in noncommunication budgets.
- Another issue raised is that end user people in most organizations are not trained to use communication equipment productively.
- One respondent suggested that the measure that should be considered in most communication systems is the potential cost of not communicating.

3. SURVEY DATA

- About 75% of the companies have some formal measuring systems for their communication systems, as shown in Exhibit III-2.
- About 80% of the companies have a system for charging end user departments for communication services used.

EXHIBIT III-2

METHODS OF MEASURING COMMUNICATIONS SYSTEM EFFECTIVENESS

METHOD	PERCENT OF RESPONDENTS*
Manual Logs	4%
PBX, CPBX Monitoring	12
Software Monitoring	16
Hardware Monitoring	9
Cost Analysis	24
Telco Statistics	4
Outside Vendors	2
Under Study	2
Total	51%*

*RESPONDENTS OFTEN REPORTED MORE THAN ONE METHOD OF MEASURING COMMUNICATION SYSTEM EFFECTIVENESS

4. IDENTIFIED PROBLEMS

- The lack of available data and the difficulty of obtaining data on communication system performance, particularly traffic data, is seen as a problem.
- There was mixed reaction on the value of chargeback systems in terms of their effectiveness in controlling usage of services.

5. IDENTIFIED PLANS

- Most of the companies do plan to implement data network diagnostic systems.
- Those few companies which have integrated voice and data communication organizations, plan to add system analysts to their staffs in order to perform studies of their voice networks and operations.

6. LEVEL OF PARTICIPATION

- The only useful participation in this subject was from the people with direct communications experience, about one-half of the participants.

7. LEVEL OF UNDERSTANDING

- The level of understanding is the same as the level of participation.

8. LEVEL OF AGREEMENT

- There was general agreement among the active participants on most issues.
- There was great disagreement on the value of chargeback systems.

9. CONCLUSIONS

- Few companies have any broadly effective measurements of the performance of their communication systems.

- Most companies have a large number of narrow measurements, usually relating data networks to failure problems and voice networks to traffic analysis.

I. OFFICE AUTOMATION

1. DESCRIPTION

- This is an overview discussing the scope, issues, and trends of all types of office information handling and the planning aspects involved in office automation.

2. DISCUSSION

- Most of the respondents felt that there was no real office automation system available to analyze.
 - Most of the existing equipment was simply independent word processors, many of which were simply used as an electronic typewriter.
- Among most of the respondents, word processing and office automation are equivalent in their perception.
- Most companies had multiple word processing systems in place and these systems were growing rapidly both in terms of number of workstations and numbers of different vendors.
- Most of the respondents felt that the integrated planning of word processing capability within their companies was grossly inadequate and, therefore, the users were, in most cases, doing this planning themselves.
 - The responsibility for performing this word processing planning has not been defined.

- In about one-half of the companies, word processing planning is now a responsibility of the data processing department.
 - This is usually a relatively recent organization change.
 - It was previously in the hands of the end user departments.
- In most of the other companies, word processing lacks a high-level sponsor to develop an integrated plan.
- A requirement of uniformly high importance is that of the interface between word processing and data processing.
 - This is a category which the respondents knew to be both important as well as difficult.
 - It is in this word processing/data processing area that the greatest system integration problems appear.
- Word processing has no real standards either in its formatting or in its methods of communication.

3. SURVEY DATA

- Essentially all the companies had word processors in place and were anticipating large growth (about 28% annually).
- About one-half of the companies had communications capabilities on their word processors and future growth of communicating word processors was even higher.

4. IDENTIFIED PROBLEMS

- There is no clear individual or organizational responsibility for office automation.

- Word processing specifically and office automation in general is very much a local planning operation today.

5. IDENTIFIED PLANS

- The data processing or information services organization is steadily gaining this office automation responsibility.

6. LEVEL OF PARTICIPATION

- There is a high level of participation.

7. LEVEL OF UNDERSTANDING

- There is a high level of understanding of the need for communications between data processing systems and word processors.
- Broader issues of office automation were less well understood.

8. LEVEL OF AGREEMENT

- There was general agreement that office automation is largely out of control in most companies, particularly with respect to the acquisition of word processing systems.

9. CONCLUSIONS

- Word processor to data processor communications is an urgent requirement in most companies.
- Word processing systems are growing rapidly and with little centralized control.

J. INTEGRATION OF VOICE AND DATA COMMUNICATION NETWORKS

1. DESCRIPTION

- This section covers the ability to share various types of communication facilities between voice and data communication applications.
 - The shared facilities include lines, both internal and external, workstations, switches, and other communication control equipment.

2. DISCUSSION

- Very few companies have any organized plans to implement any substantial level of voice/data integration, although a number are starting to give this serious consideration.
- The participants did not recognize any obvious economic or other benefits to such integration among most of these companies.
 - There is a general feeling among many of the companies that a significant budget reduction could be accomplished but rarely is this feeling backed up by any serious justification.
- One of the few serious benefits foreseen is the reduction in the number of devices required at a user's workstation.
- One major limitation to the integration of voice and data systems is the lack of organizational integration referred to previously.
- Many of the companies who have examined the subject of voice/data integration, state that it is a exceedingly difficult planning job and would be expected to open up immense areas of compatibility problems.

- All the companies recognized that they are now performing some level of voice data integration, usually in the form of alternate voice/data circuits or night time use of voice lines for data.

3. SURVEY DATA

- About 10% of the companies today have PBXs capable of handling data.
- Almost one-half of the companies plan to have data-capable PBX systems by 1985.

4. IDENTIFIED PROBLEMS

- The voice/data organizations are separate which causes a problem of coordination and planning.
- The existing equipment is not truly capable of integration.

5. IDENTIFIED PLANS

- Companies do not recognize any clear advantages to voice/data integration and basically have no plans.

6. LEVEL OF PARTICIPATION

- Participation was limited to a few people with experience or studies in some of the discussion groups.

7. LEVEL OF UNDERSTANDING

- The level of understanding was the same as the level of participation.

8. LEVEL OF AGREEMENT

- Among those who understood the issues, there was very good agreement on the problems and less agreement on the potential advantages.

9. CONCLUSIONS

- True integration of voice and data systems will not occur until sometime in the future.

IV OFFICE COMMUNICATION APPLICATIONS

IV OFFICE COMMUNICATION APPLICATIONS

- The issues reviewed in this section relate to the various types of user applications and network requirements for office communication systems.
- Also included in this section are the users' requirements for value-added services, as defined in Chapter I (Objectives of the Study) and the survey data relating to these requirements.

A. VOICE COMMUNICATION OPERATIONS

1. DESCRIPTION

- This section discusses the office communications systems for voice transmission.

2. DISCUSSION

- General agreement was reached on the common lack of knowledge of the actual operations or applications of voice communication networks.
- With a few special exceptions, such as reservation centers or other types of high-volume, multiple employee voice operations, little effort is expended on the understanding of voice communications.

- Typically, the voice communication departments have inadequate resources to perform any extensive studies.
 - Often when data processing or systems people take over the responsibility for voice communications, their first step is to add analyst personnel to their staff.
- In most organizations, the management of voice communication operations is a strongly reactive posture - "nobody called me today, therefore, there must not be a problem."
- New PBX installations, all of which were computerized PBXs, were made for economic, not functional reasons.
 - The primary economics relate to least-cost routing, operator automation, and space saving.

3. SURVEY DATA

- Approximately two-thirds of the average locations' communication expenditures were for voice communications.
- About 60% of these large locations used PBX systems, the other used Centrex.
 - This ratio is forecast to shift to 80% PBX/20% Centrex by 1985.
- The average PBX system handled 1,700 lines today and will grow to 2,500 in 1985.
 - The average Centrex system is about twice that size.

4. IDENTIFIED PROBLEMS

- The primary problems identified were the occurrence of busy signals and the data available for analysis, as shown in Exhibit IV-1.

EXHIBIT IV-1

VOICE COMMUNICATIONS PROBLEMS - PERCENT OF RESPONDENTS

TYPE OF PROBLEM	NOT A PROBLEM	SOMEWHAT OF A PROBLEM	MAJOR PROBLEM
A. Encountering Busy, No Answer, or Other Party Unavailable Conditions	42%	39%	19%
B. Information to Permit Management of PBX/Centrex and Trunk Capacities	51	26	23
C. Providing Enhanced PBX/Centrex Services to Multiple Locations in a City	67	20	13
D. User Understanding of Available Voice Services at Your Location	57	33	10
E. Access to Voice Conferencing Capabilities	81	15	4
F. Telephone Wiring Which Constrains Telephone Placement in Offices	55	38	7
G. Maintaining Up-to-Date Internal Directory	41	34	24

5. IDENTIFIED PLANS

- Most companies were in the process of converting their PBXs to computerized PBXs.
- Most companies also regarded the review of their office requirements as a continuous or, at least, frequent process.
- Most of the voice network planning was conducted by the telephone company or at least with traffic information supplied by the telephone company.

6. LEVEL OF PARTICIPATION

- Participation was obtained only from the individuals with voice communication responsibility, who represented about 15% of the total respondents.
- The problems with voice networks, mentioned in the audit survey, were obtained primarily from respondents not responsible for voice.

7. LEVEL OF UNDERSTANDING

- Except for the active participants just mentioned above, most participants had little fundamental understanding of voice operations.

8. LEVEL OF AGREEMENT

- There was a high level of agreement among the active participants.

9. CONCLUSIONS

- Voice network operation is a very specialized area in most companies.

B. ON-LINE CORPORATE DIRECTORY

I. DESCRIPTION

- An on-line corporate directory is a computerized data base containing a listing of employees in an organization along with their telephone numbers, mail addresses, office locations, organizational positions, etc.
 - The on-line element implies that that automated data base is available from remote terminals.

2. DISCUSSION

- The discussions of this topic fell into two general areas:
 - The need for an automated data base of corporate employee locations, addresses, telephone numbers, etc.
 - The need for on-line access to this data base.
- There was very general agreement that due to high employee turnover an automated data base for telephone numbers and mailing addresses is an important requirement.
 - The turnover of employees was estimated to be about one-tenth percent per day by one company which had performed a study of this subject.
- There was mixed reaction to the need for access to this data base on an on-line method.
 - Many companies (probably one-half or more) agreed that most users call a limited number of people whose telephone numbers they know.

- These companies estimate that manual systems, including information operators, can handle the relatively limited number of occasional unknown destinations adequately.
- Most companies recognized the cost and rapid obsolescence of a physical directory.
- Those respondents believing the on-line access would be desirable, point out that such a capability would require a keyboard display terminal in order to be practical.
- One of these pointed out that an electronic mail system necessitates an on-line directory and almost all of them have one.
- Some suggested that the on-line directory, if implemented, should go a step further and include an automatic call placing and redialing capability.

3. SURVEY DATA

- About one-fourth of the audit survey respondents would expect to use such a directory.
- Almost three-fourths of the forecast survey respondents would expect to use such a directory.
- The reason for this huge difference is the level of understanding of the functional capability of such a directory gained by the prior discussion of the subject by the forecast respondents.
- The premium which users would pay is only 6%.

4. IDENTIFIED PROBLEMS

- High employee turnover is the key problem to be addressed.

- A keyboard/display device is needed to permit access to such an on-line directory.

5. IDENTIFIED PLANS

- None of the companies had any plans to implement such a directory.
- Some of the companies which had implemented a corporate printed directory would not do so again because of its rate of obsolescence.

6. LEVEL OF PARTICIPATION

- Most attendees participated.

7. LEVEL OF UNDERSTANDING

- Most understood the subject prior to the discussion.
- Most gained an understanding of the issues involved during the discussion.

8. LEVEL OF AGREEMENT

- The level of agreement was high.

9. CONCLUSIONS

- If suitable display terminals were available, an on-line directory would be a salable feature, but it does not carry a high premium.

C. VOICE VALUE-ADDED SERVICES

1. DESCRIPTION

- Voice value-added services are additional features or capabilities available to enhance the utility of a voice telephone communication system.
 - Such features include camp-on or call queuing, redialing, automatic dialing, call transfer, call forwarding, station call recording, departmental billing, etc.

2. DISCUSSION

- Most of the visible value-added services related to a voice system which is performed by or at the telephone instrument itself.
- The Display Phone from Northern Telecom or the ETS from Rolm was felt by some users to be important in making executives more effective on the telephone.
- Automatic redial, call transfer, and call forwarding were the value-added services mentioned most often.
- Most of the comments made relative to voice operations were made by the individuals responsible for communications.
 - Data processing and office automation had relatively few thoughts to present on the subject of voice operations or value added services.

3. SURVEY DATA

- There was no survey data on this issue.

4. IDENTIFIED PROBLEMS

- Individuals responsible for voice found the unavailability of management data to be the most critical problem.
- Individuals not responsible for voice felt that busy signals were the greatest problem.
- Use of special features was recognized to be very low.

5. IDENTIFIED PLANS

- Users' plans were for ad hoc studies and upgrades of PBX systems.
- Some of the more forward thinking users built new features, such as telephones with displays, into their upgrade processes.

6. LEVEL OF PARTICIPATION

- The level of participation was limited to the people responsible for voice except for general reactions.

7. LEVEL OF UNDERSTANDING

- The level of understanding was largely limited to personal experiences except for the people responsible for voice communication.

8. LEVEL OF AGREEMENT

- There was little basis for agreement on this subject.

9. CONCLUSIONS

- Voice value-added services are poorly understood, not only by the ultimate users in knowing how to use such services but also by voice communication managers and vendors in knowing how to get such services used effectively.

D. VOICE MESSAGING

1. DESCRIPTION

- Voice messaging involves the ability to store and forward voice messages so that transmission and reception can be accomplished at the respective convenience of the transmitter and receiver.

2. DISCUSSION

- Many of the respondents (more than one-half) had participated in demonstrations or tests of voice messaging systems.
 - The general feeling was that such capabilities were particularly valuable and also that these views were shared by their management people who had themselves participated in some of these demonstrations or tests.
- There appeared to be two primary reasons for the high interest in voice messaging capabilities.
 - First, there is the recognition of the extent of effort expended by most individuals in the "telephone tag" mode of telephone communications.
 - Second, there is the intuitive belief that voice is a naturally more friendly interface and is one which is more likely to be used by management as well as lower level employees.
- An estimated 10% of the participants had some real experience with voice messaging systems.

- For some of these, the experience was in an artificially constrained test mode (that is, it was restricted to a given department which was often the data processing department).
- Those companies with experience recognize that the process of operating a voice messaging system effectively is more difficult than many of the technical and business press articles and manufacturers' ads have implied.
- On the other hand, they estimate that 40-60% of the messages transmitted in a successful installation are complete response messages; that is, these messages have eliminated the need for a conversation or a call back in order to complete a transaction.
- There is a common recognition that a test program of a voice messaging system requires an extended time and an extended number of participants in order to allow potential users to become familiar with the systems capabilities.
- Some companies have found that the existing voice messaging services (ECS, primarily) are today inadequate in a number of respects; these are:
 - They need a time and date stamp automatically on the incoming call.
 - They need to be able to be connected to the same number that the receiver would normally answer if he were available.
 - They need to provide the receiver with a notice that a message has arrived and is waiting for his attention.
- Much work remains to be done on voice applications research to establish practical service requirements.

- A number of companies have implemented telephone answering devices as a solution largely because these telephone answering devices provide the features mentioned above.
- The disadvantage of the telephone answering device is that it requires a dispersed (and, therefore, difficult to control) quantity of relatively expensive equipment.
 - The answering devices with the capabilities mentioned above cost in the \$500-700 range.

3. SURVEY DATA

- About one-half of the companies expect to use a voice messaging capability by 1985.
- Of the 16 possible new services suggested to the audit survey respondents, voice messaging was the service most requested.
- Less than one-half of the companies had answering devices.
 - They had only a few devices at this time.

4. IDENTIFIED PROBLEMS

- Most of the existing voice messaging systems are expensive and are functionally inadequate.
 - Users do expect both of these problems to be resolved.
- The other and much more difficult problem is that of end user training.
 - While this will be easier with voice than with data, it is still a difficult problem.

5. IDENTIFIED PLANS

- Many users are now experimenting and most will do implementation planning later.

6. LEVEL OF PARTICIPATION

- Almost everyone was involved in this issue.

7. LEVEL OF UNDERSTANDING

- There was a high degree of understanding of the potential for voice messaging.
- Most participants had little understanding of the requirements for the system or of the implementation problems.

8. LEVEL OF AGREEMENT

- There was a high level of agreement.

9. CONCLUSIONS

- Based on the users' intuitive confidence in the simplicity and the naturalness of voice, voice messaging systems are expected to achieve wide use.
- Application studies and experiments will be needed to establish real product requirements.

E. TEXT MESSAGING

1. DESCRIPTION

- Text messaging involves the capability for keyboard entry of basically unformatted messages to be stored and forwarded to one or a number of receivers at the receiver's convenience.
 - Electronic mail is usually included by users in the same definition.

2. DISCUSSION

- Most of the respondents now have some form of a text message system or are in the process of installing such a system.
 - Most of the time this text messaging or electronic mail system is an application program built into the software of a large mainframe computer.
- The workstations of these systems are usually regular data communication terminals and are often the IBM 3270 devices.
- The software is, in many of these cases, developed by the user's own staff and is often more sophisticated than that provided by commercial vendors of electronic mail software.
- Most of these kinds of systems are, in fact, operated by and for professional employees.
- One system, developed by Mobil on an IBM system, is called PROFS.
 - It is to be introduced as a standard program product by IBM in November 1981.

- A few of the companies had word processor-based electronic mail systems which are usually operated by secretaries.
 - These communicating word processing systems are only occasionally connected to the professional electronic mail systems.
- The application sequence for these communicating word processing-based electronic mail systems are:
 - First, urgent documents.
 - Second, financial reports.
 - Third, proposals and other approval-requiring documents.
 - Ultimately, replacement of most intracompany mail.
- Management has few of these text messaging devices on its desk.
 - The general feeling is that management will wait for a simpler terminal (Display Phone was specifically mentioned a number of times as typical of an acceptable terminal).
- The overall reaction to the subject of text messaging is that it is, in fact, a significantly growing requirement, but that it is being implemented within respondent companies in many different conceptual forms.

3. SURVEY DATA

- About one-third of the companies now have some form of text messaging or electronic mail system.
- Over two-thirds expect to have such a system by 1985.

4. IDENTIFIED PROBLEMS

- Most of the existing electronic mail systems are single node (one location) systems.
 - Multinode systems (such as PROFS) are only starting to be put in place.
- These types of systems, requiring a new mode of operation for the users, are extremely sensitive to failures.
- Little or no centralized control or plans exist.

5. IDENTIFIED PLANS

- Most of the existing systems were implemented less by plan than by mutual interest on the part of special groups.
- There are few companies with anything resembling a formal plan in this area.

6. LEVEL OF PARTICIPATION

- The level of participation was very high.

7. LEVEL OF UNDERSTANDING

- These systems were well understood by most participants, although usually from slightly different perspectives.

8. LEVEL OF AGREEMENT

- High level of agreement was found on the basic concept.

9. CONCLUSIONS

- Text messaging or electronic mail will become a major form of communication in most large companies.
- Communicating word processor installations will grow rapidly and will be interfaced with great difficulty to data processing systems and to other communicating word processing systems.

F. BUSINESS GRAPHICS

1. DESCRIPTION

- This subject covers the preparation and presentation of information in graphic forms.
 - It does not include engineering design graphics nor does it include high resolution or art layout graphics as might be used in advertising.

2. DISCUSSION

- Graphics, as a subject, generated an extensive amount of interest and discussion but not necessarily any complete agreement.
- There was fairly general agreement on the increasing importance of the use of graphics, particularly in terms of the presentation of information to management.
- Two applications can be defined for business graphics:
 - The analysis of graphical information by managerial or professional employees.

- The presentation of graphic material to management or other groups.
- The graphics-capable CRT (usually the IBM 3279) is finding wide and rapid acceptance in most of the respondents' companies.
 - It is being used directly as an analytical tool by managerial/professional employees.
 - It is being used as a graphics preparation tool with interactive preparation and review of presentations, many of which ultimately get converted to hard copy or slides.
- In a few companies there were some graphics CRT-type situations where the requirements apparently looked more important to the ultimate users than they turned out to be and the graphic terminals were not used.
- A key restriction recognized by many of the companies with experience in graphics is the need for and access to a data base and the lack of easily usable software with which to access that data base.
- There was significant disagreement on the extent to which senior management employees will themselves use graphics terminals.
 - Most of the respondents felt that while management is increasingly interested in seeing graphic presentations, it will not participate directly.
 - Only when the use of the terminal will be grossly simplified will management employees use graphic terminals themselves.
- All of the respondents appeared to recognize the significant difference between business graphics and engineering design graphics.

- There were some special graphics applications brought up, such as map requirements for municipal government and for geological applications.

3. SURVEY DATA

- There was no survey data on graphics.

4. IDENTIFIED PROBLEMS

- The data base access software required to interface business graphics applications is not yet simple enough to allow widespread use within companies.

5. IDENTIFIED PLANS

- Most companies are implementing graphics terminals for professional employees at a rapid rate in spite of the problem just mentioned.

6. LEVEL OF PARTICIPATION

- The level of participation was very high.

7. LEVEL OF UNDERSTANDING

- There was more apparent enthusiasm for the concept than real understanding.

8. LEVEL OF AGREEMENT

- The level of agreement was very high.

9. CONCLUSIONS

- There is no question that business graphics applications are growing and will continue to grow rapidly; however, there are going to be many false starts.

G. IMAGE COMMUNICATIONS

1. DESCRIPTION

- This subject includes the transmission of high-resolution graphic images with or without any necessary interface to a character encoding process.
 - It includes engineering drawings, art layout, transmission, as well as handwritten document transmission.

2. DISCUSSION

- Discussion of image communication applications fell into two areas:
 - The communication of high-resolution material such as engineering drawings.
 - The communication of handwritten documents between files and workstations.
- In the first application, the engineering drawings, the computer is very much a factor in the communication; the number of users is relatively small.
- The handwritten or original document transmission application is one which is a significant factor in a number of industries, such as insurance, banking, and freight transportation.
 - The application is that of the transmission of handwritten documents (claims, bank drafts, way bills) between an image file (a replacement for microfilm) and a video-based workstation.
- The understanding of these applications was restricted to those with these relatively special kinds of requirements.

3. SURVEY DATA

- About one-half of the companies expect to be using high-speed, high-resolution graphics communications by 1985.
- Very few of these expect to pay any premium for such a service.

4. IDENTIFIED PROBLEMS

- The images transmitted, in order to address the applications discussed, will require a specialized data base management system which does not yet exist, as shown in Exhibit IV-2.

5. IDENTIFIED PLANS

- Users have few plans, formal or otherwise, in this area.

6. LEVEL OF PARTICIPATION

- The level of participation was restricted to a few companies with special requirements.

7. LEVEL OF UNDERSTANDING

- The level of understanding varies widely between those few companies.

8. LEVEL OF AGREEMENT

- There was no agreement other than the need for a special data base management system.

EXHIBIT IV-2

IMAGE COMMUNICATIONS PROBLEMS - PERCENT OF RESPONDENTS

TYPE OF PROBLEM	NOT A PROBLEM	SOMEWHAT OF A PROBLEM	MAJOR PROBLEM
A. Facsimile Quality	47%	34%	19%
B. Facsimile Speed	53	35	12
C. Compatibility of Different FAX Machines	44	33	23

9. CONCLUSIONS

- There are some specialized applications, each of which will probably involve its own unique solution.

H. FACSIMILE

1. DESCRIPTION

- This subject includes all forms of printed copy transmission of page images.
 - It includes the slow-speed (Quip Telecopier, etc.) to high-speed subminute facsimile equipment such as Rapifax, Panafax, etc.
 - It does not include any interface with computer equipment.
 - The subject, as covered here, does not include the subject of high-resolution graphics which is covered under the heading "Image Communications."

2. DISCUSSION

- Users' expectations in the facsimile area continue to be somewhat at odds with the actual market experience of facsimile equipment.
 - That is, most of the respondents indicated little interest and, in a few cases, bad experiences with facsimile systems and foresaw little future for facsimile in their organizations.
 - On the other hand, it is an established fact that the growth of facsimile equipment in large companies continues at an astounding rate (over 25% annually).

- The justification for facsimile, where it does appear within the respondent companies, is primarily in two areas:
 - Low-volume applications where the volume does not justify the installation of a data communications terminal.
 - Applications where there is some amount of urgent communication required with external organizations and the function of facsimile is to reduce, if not eliminate, the interface compatibility problems.
- Only one company indicated that they were planning to use high-speed facsimile in a mail replacement application.
- Those companies indicating that they had bad experiences with facsimile also indicated a lack of planning of the facsimile system.
- Ultimately, most of the respondents seem to believe that the facsimile equipment and applications will be replaced by communicating word processors, in part because of the image quality and in part because of the growing population and availability of communicating word processors at workstations.

3. SURVEY DATA

- Most users forecast basically no growth for low-speed (more than four minutes) or medium speed (one to four minutes) facsimile.
- A few companies forecast rapid growth of high-speed (less than one minute) facsimile.

4. IDENTIFIED PROBLEMS

- Users showed little interest, even in problem areas, with facsimile.

- The bad experiences to which users referred usually related to procedural and operational problems with unplanned systems.

5. IDENTIFIED PLANS

- There were no identified plans for facsimile.

6. LEVEL OF PARTICIPATION

- The level of participation was only medium.

7. LEVEL OF UNDERSTANDING

- The level of understanding was only medium.

8. LEVEL OF AGREEMENT

- There is no basis for any agreement.

9. CONCLUSIONS

- Facsimile, at least among professional communicators who were the subject of this study, is a matter of great indifference.

I. TELECONFERENCING

I. DESCRIPTION

- This topic includes all forms of teleconferencing including voice, computer-aided, video, and other composite forms of teleconferencing.

- It includes multiple locations but is not restricted to multiple participants at each location.

2. DISCUSSION

- Most of the respondents recognize a high potential requirement for some form of teleconferencing as a result of the increasing cost and difficulty of travel.
- Some fraction of the respondents (estimated about one-fourth) are in the process of installing or planning video conference facilities.
 - Most of these are customers or are planning to be customers of some satellite carrier, often SBS.
- An interesting point raised by a few respondents, is that the senior level and frequent travelers are unlikely to be pushed into the use of teleconferencing.
 - On the other hand, lower level employees can be encouraged not to travel or to use the conferencing facilities.
- None of the companies plan on having more than one equipped video conference room in a facility before 1985.
 - On the other hand, one of the companies does plan to have a conference room on each floor and portable equipment which can be moved from room to room for video conference operations.
- Computer-aided teleconferences are unfamiliar to most companies but were found to be "sterile" by one user.
- Facsimile-aided teleconferences were used, apparently effectively, by a few (5%) of the companies.

3. SURVEY DATA

- Almost one-half of the companies planned to have conference rooms equipped for teleconferencing.
 - Most of these were voice with graphics support (including electronic blackboards).
 - A smaller number were video.

4. IDENTIFIED PROBLEMS

- Cost was almost universally mentioned as a problem.

5. IDENTIFIED PLANS

- Most companies have plans for conference rooms with some "to be named later" kind of teleconferencing equipment.

6. LEVEL OF PARTICIPATION

- The level of participation was very high.

7. LEVEL OF UNDERSTANDING

- The level of understanding was only medium.

8. LEVEL OF AGREEMENT

- On the problem of substantial cost of travel, the agreement was high.
- On the solution to this problem, the level of agreement was very low.

9. CONCLUSIONS

- There is a clear and growing need for teleconferencing.
- There are no correct solutions which are clear to respondents.

J. EXTERNAL DATA BASES

1. DESCRIPTION

- This is a discussion of users' requirements to access external data bases, or more generally, external data resources including timesharing or other calculation-related services.

2. DISCUSSION

- Relatively few companies count on any significant amount of use of external data bases or other external resources.
 - Most of the use of any kind of computer facility is being brought in-house within these companies.
- There are two key exceptions where external data bases are being used extensively.
 - One of these is in planning.
 - The other is in the insurance industry.

3. SURVEY DATA

- There was no survey data on external data bases.

4. IDENTIFIED PROBLEMS

- There were no identified problems.

5. IDENTIFIED PLANS

- Most companies have brought computing services in-house and believe that most of the required data bases are also in-house.

6. LEVEL OF PARTICIPATION

- The level of participation was low.

7. LEVEL OF UNDERSTANDING

- The level of understanding was only adequate.

8. LEVEL OF AGREEMENT

- Most of the participants agreed that this is not a problem.

9. CONCLUSIONS

- External information is not regarded as a significant requirement to most information professionals in respondent companies.
- This may not be the view of information users in those same companies.

K. SIMPLIFIED ACCESS TO COMPUTER FACILITIES

I. DESCRIPTION

- This subject covers the automation of the access procedures to connect a terminal to a computer facility.
 - It includes dialing or other line access, the initiation or handshaking procedures with the computer, the exchange and verification of passwords, the sign-off procedures, etc.

2. DISCUSSION

- Very often, in the course of these discussions, the subject of a simplified means of signing on to a computer facility, either in-house or external, was raised spontaneously by one or more of the respondents.
- They regard a "user-friendly" interface as a very significant factor in the use of terminals by an expanded population of users.
 - A simplified form of access is a key element of this user friendly interface and the respondents believe that it can be easily done and should be done.
- This area was treated as almost a given by the respondents, with no disagreement whatsoever.

3. SURVEY DATA

- Over one-half of the companies were willing to pay a premium of 10% for simplified access.

4. IDENTIFIED PROBLEMS

- There were no identified problems here.

5. IDENTIFIED PLANS

- Some companies already have a continuous log-on for many of their terminals.

6. LEVEL OF PARTICIPATION

- The level of participation was high.

7. LEVEL OF UNDERSTANDING

- The level of understanding was also high.

8. LEVEL OF AGREEMENT

- The level of agreement was extremely high.

9. CONCLUSIONS

- As a key element of providing user operational simplicity, a single button access to computer facilities is highly desirable to almost all companies.

L. MULTIMEDIA COMMUNICATIONS

I. DESCRIPTION

- This subject covers a range of different combinations of communication media.

- It includes voice and data, voice and facsimile, graphics and text, and all other combinations of communication media.
- The discussion includes the potential applications, the value of various combinations, and the likelihood of use of such combined media communications.

2. DISCUSSION

- Two forms of multimedia communications generated some level of common interest among the respondents.
 - Voice annotation of data or text reports.
 - Graphic elements included with text.
- The voice annotation was expressed by the participants as being an interesting possibility.
 - The majority of the respondents believed that voice, being a more natural form of communications, would be a useful process to incorporate with data or text reports for management operations.
- On the other hand, many participants felt that there were too many psychological and/or training barriers that might need to be overcome before this could become an acceptable way of operating.
 - Most managers want people in front of them to discuss reports of any kind.
 - Some felt that this combined process or other combined processes would require new and relatively complex thinking processes on the part of users relative to the simple use of the telephone.

- Text with graphic elements is related to the growing importance of graphics.
 - There is an increasing requirement on the part of management to see results and information summaries in graphic form and this will become an increasingly important element of all types of reports.
 - The report which you are now reading is precisely in this combined text and graphics form.
- Most of the participants felt that anything more complex than a basic display and a telephone is likely to be found only in conference rooms through the 1985 time period.
 - There was little reaction or apparent need for a desk-to-desk multi-media communication capability.
- A number of users had implemented combined voice and facsimile communications during management multilocation conferences.
 - This is often a replacement for live video teleconferencing.

3. SURVEY DATA

- About one-third of the companies could foresee implementing multimedia communications.

4. IDENTIFIED PROBLEMS

- The primary problem is that the concept of multimedia communications is difficult to visualize and will, accordingly, be difficult to introduce to users.
- Presumably, the associated data base management system requirement will also be a problem.

5. IDENTIFIED PLANS

- There were no identified plans for multimedia communications.

6. LEVEL OF PARTICIPATION

- The level of participation was only medium.

7. LEVEL OF UNDERSTANDING

- The level of understanding was low.

8. LEVEL OF AGREEMENT

- There was no basis for a level of agreement.

9. CONCLUSIONS

- Multimedia communications appear to respondents to have some conceptual merit, but few anticipated a high level of acceptance.

M. INTEGRATED FILING

I. DESCRIPTION

- This is a subject treated in conjunction with the discussion of multimedia communications.
 - It includes the filing of multiple information media, including character encode information such as data and message.

- It includes additional capabilities such as voice, graphics, higher resolution image, etc.
- Most importantly, it addresses these issues as an integrated matter such that the various media could be stored as associated and retrievable data elements.

2. DISCUSSION

- The discussion of integrated or multimedia filing was very closely associated both in time and in the respondents' conceptions with that of multimedia communications.
- Two new forms of storage, voice and image, needed extensive discussion with the participants in order to elicit any serious interest.
- Long-term storage (as opposed to message store and forward) of voice information is, first of all, foreseen as an external technology by most of the participants but recognized as a useful potential future tool.
 - Some users went so far as to say that the storage of voice information may be the item that replaces paper in the office and, therefore, also replaces many of the people who create and manage paper.
- Image storage is important in two application areas.
 - The storage of original documents which in some industries has a very high application requirement.
 - These industries - banking, insurance, and freight transportation - were discussed earlier in this report.

- The application is that of the electronic storage of original, usually handwritten, documents as a potential replacement for microfilm.
 - The other image application is in use now and is in the form of high-resolution image storage for maps along with the associated data such as coordinates and location identification and description.
 - It is used in municipal governments and geological operations.
- Most of the participants felt that there were important elements to be developed prior to the success of integrated filing applications.
 - One of these elements was the workstation capability from which the integrated files would be accessed.
- Many believe that records management and data base management have to be developed further before integrated filing can be useful.
- In all cases, the participants believed that the actual technology for voice and video storage is some years away and, therefore, not worthy of significant planning.
- Nevertheless, there are several respondent companies who are specifically studying this.
- One of the greatest incentives for examining this subject is the huge expense of storage, including magnetic, photographic, and paper, which is impacting large companies.

3. SURVEY DATA

- Almost one-half of the companies anticipated implementing an integrated or multimedia file capability by 1985.

- Users' expectations for multimedia filing were higher than for multimedia communications.

4. IDENTIFIED PROBLEMS

- Users, first of all, question the technology of storage of voice and graphics as well as the data base management systems required.
- The same difficulty in conceptualization is present here as in communications.

5. IDENTIFIED PLANS

- A few companies are examining special applications, particularly those replacing microfile techniques.

6. LEVEL OF PARTICIPATION

- The level of participation was medium.

7. LEVEL OF UNDERSTANDING

- The level of understanding was low except in some special application companies.

8. LEVEL OF AGREEMENT

- The level of agreement is the same as the level of understanding.

9. CONCLUSIONS

- Integrated filing is likely to be a by-product of companies' needs to reduce information storage costs.

N. DESK-TO-DESK MULTIMEDIA TELECONFERENCING

1. DESCRIPTION

- This subject is a combination of some of the previous elements in that it includes the multimedia communications, the ability to perform multipoint teleconferencing, and, most particularly, to use these capabilities at an individual desk or workstation.

2. DISCUSSION

- Some of the respondents made the point that standard voice conferencing is a functional capability which, although it exists and is relatively convenient, is only infrequently used in most organizations.
- The one type of desk-to-desk conferencing which most respondents believed will become accepted in the near future is the combination of voice with data.
 - In most cases, the concept envisioned was that of a display on a data terminal which is being viewed simultaneously by all conference participants.
- In a few cases, the annotation of text or data messages by voice information was discussed, but this application was more in the nature of a message-type application rather than a conference-type application.
- Desk-to-desk video teleconferencing was regarded as well beyond the 1985 planning horizon. This video teleconferencing would, according to the vast majority of users, be found only in conference rooms in that time period.

3. SURVEY DATA

- Almost one-half of the companies expected to implement voice teleconferencing with data/text aids at users' desks by 1985.
- Less than one-fourth expected to implement image support by 1985.
- Only one-tenth expected to have desk-based video teleconferencing in that time period.

4. IDENTIFIED PROBLEMS

- The primary problem is again that of end user acceptance.

5. IDENTIFIED PLANS

- There were no identified plans.

6. LEVEL OF PARTICIPATION

- The level of participation was only medium.

7. LEVEL OF UNDERSTANDING

- The level of understanding of the concept was high.
- Understanding of issues and solutions was low.

8. LEVEL OF AGREEMENT

- There was no basis for a level of agreement.

9. CONCLUSIONS

- If the appropriate equipment is found at the workstation (and it will most likely be there for some other application), it may be used for voice-plus types of teleconferences.

0. INTRACITY COMMUNICATIONS

1. DESCRIPTION

- The interfaces from a building to long-distance networks or to any other external information resources require an interface to the local loop or intracity communication network.
 - This section discusses the issues and problems associated with these interfaces.

2. DISCUSSION

- This subject was raised in conjunction with requirements for private voice networking.
 - Many of the companies had multiple, large locations within the same cities.
 - In some cases, these buildings were literally across the street from each other, but in many cases they were scattered fairly widely around a metropolitan area.
 - This point became a very significant element of large user requirements in the INPUT study, User Communication Networks and Needs, performed in 1980.

- Most of the respondents with requirements for private voice networking treat the buildings as independent entities with tie trunks between them for their voice networks.
 - Only a few of these companies recognized any significant requirement for a common numbering scheme around those multiple voice systems.
- The few companies which did recognize such a requirement have that requirement met through the use of either Centrex or an element of their CCSA network.
 - In other words, through telephone company services.
- Many of the participants had significant amounts of intracity data requirements.
 - Frequently, these requirements were for wide bandwidth (that is, 56 KBS with requirements ranging up to 1.5 MBS and higher).
- Some of the companies with closely spaced buildings, such as across the street or a common campus, have arranged for either cables or conduit space between those buildings and plan on implementing a telephone switch covering both buildings with common numbering of extensions.
- The use of the "dial 81, 82, etc." for accessing tie trunks to other buildings was not regarded as a serious problem to most of the users.
 - As some companies said, "They have to dial 27 digits for SPRINT."
- Some of the municipal governments participating in these meetings, have implemented city-wide private networks using city-owned cables and switches.

3. SURVEY DATA

- There was no survey data on intracity communication.

4. IDENTIFIED PROBLEMS

- The unavailability of low-cost, intracity, multiple VF or wideband circuits was identified as a problem.

5. IDENTIFIED PLANS

- Some companies have installed their own ducts and/or cables over short distances (e.g., across the street) which represents their planning efforts.

6. LEVEL OF PARTICIPATION

- The level of participation was limited to a few companies with multiple, closely spaced large locations.
- Voice discussions were basically independent of data discussions.

7. LEVEL OF UNDERSTANDING

- Very few companies recognized intracity communications as a problem.

8. LEVEL OF AGREEMENT

- There was no level of agreement.

9. CONCLUSIONS

- Intracity private networks are not regarded as a major problem.

- Specific links between large, closely spaced locations of the same company are regarded as an economic problem only.

P. INTRABUILDING COMMUNICATIONS

1. DESCRIPTION

- This subject addresses the requirements for various modes or media of communications within a building.
 - It addresses the applications and the numbers and types of equipment required to communicate with each other within a single building or a campus of buildings.

2. DISCUSSION

- A significant portion of every one of the discussion sessions was devoted to this topic.
- Generally, the discussions divided into three general categories.
 - The inadequacy of existing systems of intrabuilding networks.
 - The huge anticipated requirement for intrabuilding network capability.
 - The significant requirement for planning effort prior to implementing such a network.
- The inadequacy of existing systems again fell into two categories.
 - The inadequacy of PBXs to handle data traffic, particularly synchronous protocols.

- The limited nature of the wideband service offerings, such as Ethernet and other similar networks.
- Many of the companies (more than one-half) have computerized PBXs and are giving serious consideration to the use of these PBXs to handle their data communication traffic.
 - The major problem with PBXs is the speed and code limitations imposed on all of the existing units in spite of the advertising claims by the vendors of such units.
 - Most of the existing data-capable PBXs can only handle low-speed asynchronous kinds of data traffic.
- Most of the companies were familiar with the wide-band systems such as Ethernet and many were familiar with other alternatives, such as the Wangnet and the Teltone kinds of systems.
 - In most cases, the participants regarded these service offerings as much too limited in terms of the scope of products which could be attached to these networks.
 - Most participants believe that these were too limited to make any commitment toward implementing such a network today.
- The only exceptions to this limitation seem to be among some companies who have extensive installations of Xerox equipment.
 - Even here, however, the limitation of Ethernet seems to be its present inadequacy to handle the range of existing Xerox word processing products.
- Some companies regarded the existing wideband solutions as being too expensive today.

- Some suggested that the expected problems of use of coax cables of any kind is just beginning to surface.
- There was total agreement on the future need for some means of handling the anticipated increase in the numbers of data terminals and other kinds of workstations.
 - Communicating word processors are expected to require an additional amount of capability.
- In most cases, the requirement is expressed in terms of finding some means of replacing the growing "spaghetti bowl" of coaxial cables which connect data terminals and word processing devices to the central processing units.
- The companies recognize the need to plan.
- In a large number of companies, the planning problem is imminent in that they are currently in the process of constructing new buildings and have to make decisions on the wiring of them.
 - Most of the solutions to these urgent problems are relatively cautious, such as leaving room in the ducts or raceways for potential new cable.
 - In some other organizations, the solution is more aggressive such as installing dual coax as well as four-pair twisted wire cable systems to all potential workstation locations.
- One of the planning problems mentioned is that while modular partitions and false ceilings allow significant flexibility in most offices, in executive offices new outlets are exceedingly difficult to install due to the use of plaster ceilings and walls.
- The ultimate conclusion reached by most of the companies (more than one-half) is the "wait and see" approach.

- Some companies specifically suggested that they were not planning on doing anything for two years until the intrabuilding technology was stabilized and vendors standardized on an approach.

3. SURVEY DATA

- Almost one-half of the companies expect to have implemented one or more coax-based local area networks by 1985.
- Over one-half of the companies will have changed their existing PBX system by 1985.

4. IDENTIFIED PROBLEMS

- The primary problem is the fluidity of the intrabuilding communications technology.
- The other major problem is the narrowness of the existing solutions.

5. IDENTIFIED PLANS

- The only clearly identified plans are those which call for retaining flexibility.

6. LEVEL OF PARTICIPATION

- Almost all companies participated.

7. LEVEL OF UNDERSTANDING

- Some companies have studied the existing solution and all companies understand the basic problem.

8. LEVEL OF AGREEMENT

- There is a high level of agreement on the need for flexibility and caution.

9. CONCLUSIONS

- There is a large and rapidly growing requirement for connecting information devices of all kinds within buildings.
- Adequate solutions are not yet here, but the problems are being addressed by many vendors and practical solutions are imminent.

Q. COMPUTERIZED PBX SYSTEMS

1. DESCRIPTION

- This subject addresses the perceived capabilities and users' expectations for PBX systems with computer control.
 - It does not necessarily restrict the subject to those PBX systems with data transmission and switching capabilities.

2. DISCUSSION

- Most of the companies participating either have now or are planning to buy computerized PBX systems in the relatively near future.
- The primary reason for the computerized PBX is its immediate cost justification.
 - A secondary reason is the need for expanded capacity.

- The cost justification falls into two major areas.
 - The cost savings due to network control features, that is, least cost routing, operator automation, etc.
 - The ability of the computerized PBX to reduce the cost of changing extensions, answering groups, station authorizations, etc.
- There was general acknowledgement that the existing PBXs, including the existing computerized PBXs, will not meet future requirements which are primarily those data and word processing intrabuilding communication requirements mentioned earlier.
- There was very mixed opinion on the effect that data requirements have on current purchases of PBXs.
 - Some companies contended that they would not consider a PBX which did not have a data capability.
 - They assume that the vendors will be able to upgrade the existing PBXs to include those users' future data requirements.
 - On the other hand, there were a number of companies who suggested that the data requirements had little or no effect on their current purchases of PBXs.
- Canadian users, in particular, expressed some degree of concern or lack of security because of the relatively small number of users of computerized PBXs in Canada at this point in time.
- Two users mentioned the Bell approach of selling PBXs with an energy control package.
 - This program is addressed to the plant engineers.

- It justifies the PBX on a six-month payback of the entire system based on its ability to monitor and control the energy required to heat and illuminate buildings.
- Many of the users expressed a view that a PBX system should be planned on a write-off basis in which the system could be economically replaced in no more than three years.
- PBX replacement situations are strongly influenced by the local user organization (plant manager, division manager, etc.) and by corporate fiscal policy.

3. SURVEY DATA

- The PBX/Centrex mix in the headquarters locations of respondent companies is now 60/40.
- Users expect this to change to 80/20 by 1985.
- The average location in this study had a PBX with 1,700 lines today, and growing to 2,500 lines by 1985.
- About one-half of the companies expected their PBX system to be handling data by 1985.

4. IDENTIFIED PROBLEMS

- Obsolescence is seen as a big problem.

5. IDENTIFIED PLANS

- Most users are converting rapidly to computerized PBXs but on a lease or short-term write-off basis.

- Many companies are incorporating new features, such as display telephones, on a largely experimental basis.

6. LEVEL OF PARTICIPATION

- The level of participation was high, even including nonvoice participants.

7. LEVEL OF UNDERSTANDING

- The level of understanding was medium to high depending on the level of voice experience in the group.

8. LEVEL OF AGREEMENT

- The level of agreement was the same as the level of understanding.

9. CONCLUSIONS

- Major companies are buying computerized PBXs now, usually without major consideration for their data handling capability.

R. WIDEBAND INTRABUILDING NETWORKS

I. DESCRIPTION

- This subject addresses the wider than voiceband types of systems being proposed to users by a number of vendors today.
 - It includes Ethernet, ARC, and other wideband-shared transmission facility systems offered on an intrabuilding basis.

- The implementation of these systems is usually on a coax cable but may also be implemented on twisted wire cables.

2. DISCUSSION

- Most of the participants were familiar with the Ethernet system of Xerox and many were familiar with the ARC System, Wangnet, Amdax, Teltone, and other kinds of wideband technologies.
- While most recognize the anticipated growth of in-house terminals and other workstations, few are prepared to implement any of the existing wideband systems.
- The primary limitations restricting users from considering a wideband system fall into two categories.
 - First of all, there is the problem of interfacing a variety of devices; most of the existing wideband systems are relatively limited in that respect.
 - Second, there is the problem of interfacing between those wideband systems and other types of networks, particularly long-distance data transmission networks.
- Some of the companies have implemented multiplex systems which are essentially transparent to the speeds and codes of the equipment attached at either end.
 - Teltone and Amdex specifically were mentioned.
- A few of the companies have implemented an ARC system.

3. SURVEY DATA

- Almost one-half of the companies expect to have implemented one or more coax-based local area networks by 1985.

4. IDENTIFIED PROBLEMS

- As previously noted, most users are uncertain about the future capabilities of wideband systems and about their relative capabilities versus other alternatives.

5. IDENTIFIED PLANS

- The level of attention being paid to the subject has caused users to initiate efforts to define the scope of their problems.
- A few users are experimenting, but none are making major planning commitments.

6. LEVEL OF PARTICIPATION

- The level of interest is very high in this subject.

7. LEVEL OF UNDERSTANDING

- Other than knowing the present limitations of Ethernet, few companies really understand this subject.

8. LEVEL OF AGREEMENT

- There was no basis for a level of agreement.

9. CONCLUSIONS

- The general feeling is that there is "something" in this wideband network concept, but no one knows yet what it is.

5. WORKSTATIONS

1. DESCRIPTION

- This subject addresses the functional and operational requirements of communicating workstation equipment likely to be located in an office environment.
 - Also discussed are the types of users and variation of requirements by user type.

2. DISCUSSION

- The subject of workstations generated by far the most active discussion and the most significant levels of varied opinions on the requirements and future expectations.
- The discussion generally could be classified into three categories.
 - The types of people who will use workstations.
 - The types of applications for which workstations will be used.
 - The requirements for the workstation and its features.
- A consensus was reached that the character of employees in most businesses will be changing rapidly in the near future due to their increased prior

exposure to computer applications and specifically to equipment, such as Radio Shack computers.

- The exposure of junior management employees to computer terminals and computer operations will also be an increasingly important factor over the next five to ten years.
- Not only will the new employees use information workstations but their use of these devices will put pressure on higher level employees to use these types of systems themselves.
- One specific estimate offered by a participant who had done some examination of the subject is that by 1985, 20% of the professional employees in a company will have workstations on their desks; management employees will reach that 20% level at a later time.
- One application with general agreement was that of electronic mail which most of the participants agreed would be the first terminal application likely to find its way into a workstation environment.
- The second application (with significantly less agreement) was that of word processing, or report or correspondence preparation or review.
- The third application was that of timesharing or remote computer access.
 - This is the application which is now a significant factor in creating the huge growth of terminals in most companies.
 - These are usually shared location terminals rather than workstations at this time.
 - They will become individual workstations in the near future.
 - However, this application was primarily for professional employees.

- Another application mentioned was that of project control terminals for middle management employees.
 - Many middle management employees with supervisory responsibilities over large equipment systems (railroad yard supervisors, process plant supervisors) already use information workstations.
- There was wide agreement on the distinction of requirements between those for secretarial employees, professional employees, and management employees.
 - The requirements for a secretarial employee workstation are basically those of a communicating word processor in most cases.
 - The professional employee requirement is for data terminals, and the 3270 is acceptable to a professional employee in spite of or, as some mentioned, perhaps because of its size and apparent complexity.
 - For management employees, some significant form changes are needed and a much simpler type of device is required.
 - Most participants felt that today's workstations would not be adequate for a management level workstation because of their size, complexity, and difficulty of use.
 - Specifically, the Display Phone was mentioned as a good way to start with a management terminal.
- There was a good deal of disagreement on the extent of complexity which would be acceptable at a management workstation.
 - Participants argued, in some cases very strongly, that executives are intelligent, will adapt, and can, in fact, type.

- Most of the participants disagreed with this view, particularly as to senior management and as to this point in time.
- A few companies (about 10% or less) have Xerox Star Systems in testing or in planning.
- A number of participants mentioned the extensive requirement for software to support the operations at the terminal, particularly the management terminal.
 - The software would require a significant amount of prior effort to make the terminal useful for management employees.
- The aesthetics of the terminal are also expected to be important in management workstations.

3. SURVEY DATA

- The primary relevant data is on data terminal installations and communicating word processor installations.
 - The average number of data terminals per employee is 0.125 today rising to 0.25 in 1985.
 - Communicating word processors per employee are about 1 per 100 employees today increasing to 1 per 30 employees in 1985.

4. IDENTIFIED PROBLEMS

- The definition of the function to be performed is unknown.
- Training and acceptance by users are expected to require significant effort.

5. IDENTIFIED PLANS

- Most companies are simply responding to user demand today.

6. LEVEL OF PARTICIPATION

- The level of participation is very high.

7. LEVEL OF UNDERSTANDING

- This topic raised many different viewpoints from different people who each understood different aspects of the applications.

8. LEVEL OF AGREEMENT

- There is a high level of agreement on the expectations of great new things.

9. CONCLUSIONS

- Workstations are now evolving, mostly from data terminals, into a significant factor in office information systems.

T. PERSONAL COMPUTERS

I. DESCRIPTION

- This subject addresses the functions and the potential impact of the presence of personal computers within an office environment.

2. DISCUSSION

- Most participants agreed that personal computers are appearing in increasingly large numbers within their companies.
- They all see the situation as being essentially uncontrollable by central management.
 - A number of companies are trying to eliminate this equipment by providing or insisting upon centralized computer processing services.
- The key problem seen by most of the participants is not the expense of the purchase of these personal computers but rather the wasted time of the users of these computers; the waste appears in two different areas.
 - The reinvention of wheels by relatively high-priced professional employees.
 - The poor quality of computer work performed on such equipment by these high-price professional employees.
- Most of the participants agreed that for those users who are successful in performing useful, functional activities on these personal computers, the path will ultimately lead to a need to access the central data base.
 - While few cases have yet appeared in most companies, the participants foresee a problem in terms of compatibility and service with personal computers.

3. SURVEY DATA

- There was no survey data on personal computers.

- INPUT, in a separate study, estimated a total of 600,000 personal computers will be installed in large companies by 1985.

4. IDENTIFIED PROBLEMS

- The cost of high-priced professionals programming these machines inefficiently was seen as a problem.
- The acquisition of these personal computers is out of the control of the central information staff and the company itself.

5. IDENTIFIED PLANS

- Some companies are trying to preempt these machines with central computer services.

6. LEVEL OF PARTICIPATION

- The level of participation was high.

7. LEVEL OF UNDERSTANDING

- The level of understanding was also high.

8. LEVEL OF AGREEMENT

- The level of agreement was high.

9. CONCLUSIONS

- Users of personal computers will only be controlled by their immediate managers.
- The effective use of personal computers is still very much an open question.

V IMPLEMENTATION ISSUES

V IMPLEMENTATION ISSUES

- This section addresses the principal issues which users encounter in installing and operating office communication systems.
- Also included are the users' reactions to and preferences for various types of potential solutions to these issues.
 - While some of these issues relate to the technology, most relate to the organization, management, and motivation of people.

A. COMPATIBILITY

1. DESCRIPTION

- This section discusses the form and extent to which compatibility problems are felt in most user organizations.

2. DISCUSSION

- Compatibility between and among systems was agreed to be a problem in all the participating companies.

- The problem appears to be distinguishable into a number of widely different areas including word processing, data communication terminals, wideband data networks, and distributed data processing. Each is discussed below.
- The largest compatibility problem seen by the participants is that of interfacing between word processing systems and computers or between various types of word processing systems.
- As with personal computers, the word processors have been a largely uncontrolled purchase situation with most companies using a large number of word processing vendors.
- Interfacing between word processors involves two different levels of compatibility.
 - The first level is the data transfer level which is usually partially resolved by having the word processing vendor provide an IBM data interface (usually, this is in the form of a 3780C-type interface).
 - The other level of compatibility is that of format protocols in which special codes and special text management procedures differ between vendors of word processing equipment and are exceedingly difficult to reconcile.
- Another source of compatibility problems is that between data terminals and data processing systems.
 - This has apparently become less of a problem with most of the participants in that they are, in most cases, using relatively standard protocols, usually IBM, for interfacing between different types of equipment.

- New corporate acquisitions bringing different kinds of data processing systems into the corporate data communication network often create compatibility problems.
- Companies with worldwide data networks have a significant interfacing problem because of the wide range of both terminal equipment and protocol-sensitive communication services.
- Distributed data processing presents a major compatibility problem in most companies in terms of requiring an expensive solution because most of the companies use non-IBM equipment for their distributed data processing operations.
- Many of the participants criticized the IBM capability in distributed data processing operations relative to that of the minicomputer vendors, such as Hewlett Packard.

3. SURVEY DATA

- Over one-half of the respondents expected to be using some form of data terminal compatibility capability by 1985.
- Over two-thirds expected to be using such a capability for communicating word processing by 1985.

4. IDENTIFIED PROBLEMS

- About one-third of the companies identified data terminal or communicating word processing compatibility as a major problem, as shown in Exhibit V-1.
- Many users suggest that while device interfacing is now a major problem, the compatibility requirement of integrated systems, such as voice and data, will be greater.

EXHIBIT V-1

DATA COMMUNICATIONS PROBLEMS - PERCENT OF RESPONDENTS

TYPE OF PROBLEM	NOT A PROBLEM	SOMEWHAT OF A PROBLEM	MAJOR PROBLEM
A. Compatibility of Different Manufacturers Communicating Word Processors	35%	32%	33%
B. Terminal Speed, Code, and Protocol Conversion	33	47	30
C. Communications Cabling for Multiple Terminals	52	33	15
D. Interface of Local Area Networks to Out of Building Networks	71	22	7
E. Mixing of High and Low Volume Devices on Same Circuits	61	31	8

5. IDENTIFIED PLANS

- Plans are discussed in more detail in the following section of this report.

6. LEVEL OF PARTICIPATION

- The level of participation was very high as every company acknowledged the problem.

7. LEVEL OF UNDERSTANDING

- The level of understanding was very high in terms of its impact.

8. LEVEL OF AGREEMENT

- The level of agreement was very high.

9. CONCLUSIONS

- Device and system interfacing present major compatibility problems.

B. SOLUTIONS TO THE COMPATIBILITY PROBLEMS

I. DESCRIPTION

- Users can solve equipment or system compatibility problems in a number of ways, and this subject is intended to examine the preferred methods of solution; included among these possible solutions were:
 - A standardization or control of vendors.
 - A black box interface which can translate between devices or systems.

- A value-added service to interface between different types of devices or systems.

2. DISCUSSION

- The almost universally preferred solution could be expressed as "tight control" of acceptable equipment.
- To most of the users, this was expressed as a list of approved vendors, each of whom provided a relatively standard, specified interface to other kinds of equipment.
 - Usually the specified standard was some form of IBM device communications protocol.
 - Increasingly, this is SNA although BSC interfaces, particularly of the batch variety (3780C), are very popular.
- This "tight control" also implies a reduced number of vendors although most of the participants agreed that the number of vendors could not be reduced to one.
 - This is particularly true in the word processing areas where the minimum at present is at least two to three vendors.
- Any kind of a solution which inserts an additional vendor into the picture is less desirable to most of the companies.
- Black box solutions, while used by a number of the companies, are generally undesirable or less attractive to these companies for a number of reasons.
 - They often cost more than the basic equipment.
 - They present a reliability burden.

- They present a problem in the logistic management of dispersed equipment.
- They represent the introduction of an additional vendor with whom to deal.
- Service solutions would be attractive only if an urgent solution requirement is necessary.
 - Again, the problem is that of the introduction of an additional vendor.
- Software solutions are less desirable because of the huge expense often associated with such a solution.

3. SURVEY DATA

- Service solutions to the compatibility problems will be used by one-half to two-thirds of the companies, but they will be used for less than one-half of their devices.

4. IDENTIFIED PROBLEMS

- The cost of the compatibility solution is usually more than the cost of controlling and preventing the problem in the first place.
- Users recognize the potential disadvantages of premature standardization and vendor lock-in.

5. IDENTIFIED PLANS

- Most companies adopt the controlled standard interface solution as their primary solution and use services and black boxes only when unavoidable.

6. LEVEL OF PARTICIPATION

- The level of participation was very high.

7. LEVEL OF UNDERSTANDING

- The level of understanding was very high.

8. LEVEL OF AGREEMENT

- The level of agreement was very high.

9. CONCLUSIONS

- Given the variety of solutions to the incompatibility of devices, most companies favor the controlled vendor approach.

C. COMMUNICATIONS MANAGEMENT

I. DESCRIPTION

- As communications systems become more complex and form a larger fraction of a company's budget, and as communications equipment and service vendors become more competitive, the problem of managing the many operations becomes a significant problem in itself.
 - This subject is intended to address the magnitude of these problems and the manner in which most companies are seeking solutions to this communications management problem.

2. DISCUSSION

- Only the communications managers among the participants were able to comment reasonably on this topic.
- The general nature of the comments was that increased user control of their communications networks is an exceedingly important and desirable situation.
 - However, there is a significant amount of difficulty in obtaining enough competence in-house to be able to perform such communications management.
- The three primary capabilities required in the communications management area are as follows:
 - The first requirement relates to the management of maintenance or of failure situations.
 - The second requirement is the capability to perform traffic analysis and network modifications resulting from the traffic analysis.
 - The third requirement is that of performing routine monitoring-type tests to insure the proper working of the communications network.

3. SURVEY DATA

- Availability of adequate technical personnel was a major problem to 13% of the respondents.

4. IDENTIFIED PROBLEMS

- The availability of qualified technical people is a major problem, as shown in Exhibit V-2.

EXHIBIT V-2

COMMUNICATIONS MANAGEMENT PROBLEMS - PERCENT OF RESPONDENTS

TYPE OF PROBLEM	NOT A PROBLEM	SOMEWHAT OF A PROBLEM	MAJOR PROBLEM
A. Data Network Monitoring Systems	60%	20%	10%
B. Voice Network Monitoring Systems	61	28	11
C. Traffic Data Collection and Analysis Systems	58	32	10
D. Remote Diagnostic Capabilities	62	29	9

5. IDENTIFIED PLANS

- The major strategy is to bring as much control in-house as the user organization can handle.

6. LEVEL OF PARTICIPATION

- The level of participation was restricted to the communications-responsible individuals in the groups (about 20%).

7. LEVEL OF UNDERSTANDING

- The level of understanding was restricted to those of the communications-responsible individuals who had operations management responsibility as opposed to technical responsibility (about 5%).

8. LEVEL OF AGREEMENT

- There was substantial agreement but with a very small group.

9. CONCLUSIONS

- Communications management will be increasingly important but will be hindered by the unavailability of technically qualified personnel and the complexity of the subject.

D. NETWORK SECURITY

I. DESCRIPTION

- Information carried on communication networks is subject to access either by unauthorized outsiders or by unauthorized employees.

- The networks discussed include voice networks as well as data, message, and teleconferencing networks.
- The issues addressed are the users' experiences with problems in this area as well as the management awareness of the extent of the problem.

2. DISCUSSION

- The primary concern expressed by the participants on the subject of security is that of access security, that is the access of unauthorized parties to data base information that is a part of the network.
- Transmission security, that is transmission requiring encryption or voice scrambling, was not recognized by the participants as being an important consideration in most situations.
- The largest companies recognized that their networks are being accessed regularly by outsiders.
 - Usually the outsiders are "game players."
 - An example given was the billboarding of timesharing network passwords on a regular basis by amateur computer clubs.
- There are some specific applications where security is a major consideration.
 - These include the police communication networks and, in a few cases, the international voice communication networks.
- A number of the participants mentioned that the costs of stealing information are usually significantly higher than the value of the information stolen.

- Another similar point was made on the availability of more valuable information in the garbage removed regularly from the data processing room.
- In the voice area, the primary concern is the eavesdropping of the local voice network by employees.
 - It is this concern that causes the wide use of private business lines into executive offices bypassing the company PBX in order to avoid the curious listener who might gain access to the lines.
- Many of the companies felt that the teleconferencing systems implemented on satellite networks may present an important security issue, but one which is not today recognized by corporate management or corporate communication personnel.
- A problem recognized by some companies is the possible requirement to demonstrate a higher level of security for compliance with privacy laws relating to employee data bases.

3. SURVEY DATA

- Less than one-half of the companies expect to implement a data encryption capability and about one-fourth of the employees would use it.
- Less than one-fourth of the companies expect to implement a voice encryption capability and only 1 employee in 20 would use it.

4. IDENTIFIED PROBLEMS

- The recognition or awareness of any communication security problem is almost nonexistent.

5. IDENTIFIED PLANS

- Plans are drawn only in special circumstances.
- Protection of data base access by passwords is a regular procedure.

6. LEVEL OF PARTICIPATION

- The level of participation is high.

7. LEVEL OF UNDERSTANDING

- The level of understanding is low.

8. LEVEL OF AGREEMENT

- There is high agreement on the lack of awareness of a problem.

9. CONCLUSIONS

- Transmission security is not a recognized problem.

E. THE RELIABILITY OF VALUE-ADDED SERVICES

1. DESCRIPTION

- This subject addresses the users' need for reliability of the value-added services obtained.
 - It compares this reliability with the reliability required of the basic communication services onto which the value is added.

2. DISCUSSION

- In terms of comparing the reliability of value-added services to the reliability of the basic communication service to which the value is added, almost all of the participants believed that the value-added service must be as high or higher in reliability than that of the basic service.
 - The reason for this is the need for credibility on the part of the user for his possible use of this value-added service.
 - If the value-added service demonstrates a lower level of reliability, people will regress to their former method of handling the function.
- The point made by a number of the participants in conjunction with this issue is that the reliability requirements of all communication services, particularly data communication services, are going up dramatically and the reliability levels of the service offerings are not keeping pace.
 - This is particularly true of transmission facilities.
- A point made by a few companies, primarily those in the financial industries, is that the reliability of their voice network is a much more important consideration than the reliability of their data network.
 - They made the point that if their data network is down, they can limp along on manual methods for at least a short period of time; whereas, if their voice network is down, they are out of communication with their customers and, therefore, totally out of business.
- Another point made by a participant is the need for a true failure-insensitive type of communication service.
 - The Tandem computer system was used as a potential solution which might be, but is not now, applied to communication services.

3. SURVEY DATA

- There was no survey data on the reliability of value-added services.

4. IDENTIFIED PROBLEMS

- As user organizations become more dependent on communication-based services, the backup provisions (usually the previously used manual system) are allowed to atrophy and cease to be usable as a backup.

5. IDENTIFIED PLANS

- Users are bringing in-house a significant amount of network monitoring and automatic control capability.

6. LEVEL OF PARTICIPATION

- The level of participation was only medium.

7. LEVEL OF UNDERSTANDING

- The discussion of solutions was restricted to the communicators.

8. LEVEL OF AGREEMENT

- There was high agreement on the growing problem.

9. CONCLUSIONS

- Because the use of any value-added service is an end-user option, its use is highly sensitive to any kind of user inconvenience, particularly failure.

F. THE CONTINUANCE OF OBSOLESCEMENT EQUIPMENT

1. DESCRIPTION

- Recognizing that equipment will remain in place in most user networks beyond the availability of newer kinds of replacement equipment, this subject addresses the users' expectations on the extent of overlap between new and obsolescent equipment.

2. DISCUSSION

- The discussion of this issue was interesting in that it covered a subject which relatively few of the participants had considered directly.
- The initial reaction was that the obsolescent equipment would be replaced within a relatively few years.
 - BSC devices specifically, which was the question addressed, would be eliminated by 1985.
- After some further discussion, it was agreed that some number of BSC devices (BSC being used here as an example of obsolescent equipment) would continue for probably another ten years.
- People tend to keep the equipment to which they have become accustomed. When the people themselves are moved or transferred, the equipment can be updated without significant repercussions.
- Companies now have a huge and rapidly growing investment in data communication terminals which they cannot afford to treat lightly.

3. SURVEY DATA

- There was no survey data on this issue.

4. IDENTIFIED PROBLEMS

- The primary problem, over and above financial considerations, which are considerable, is that once the end users get familiar with a device, it is both disruptive and expensive to change to another device.

5. IDENTIFIED PLANS

- The only plans were informal plans which were based upon a gradual rather than rapid conversion to newer equipment.

6. LEVEL OF PARTICIPATION

- The level of participation was only medium.

7. LEVEL OF UNDERSTANDING

- The level of understanding changed in the course of the discussion.

8. LEVEL OF AGREEMENT

- The level of agreement also changed in the course of discussion.

9. CONCLUSIONS

- The consensus was that obsolescent information products would probably remain in most companies for at least 10 years.

G. TRAINING

1. DESCRIPTION

- The subject of training is one of a number of "people" issues which are a significant element in the marketing and use of new products or new product features.
 - The subject addresses users' experiences with training requirements and problems, and users' expectations and experiences with the performance of vendors in the handling of new equipment training.

2. DISCUSSION

- Training is an issue which came up repeatedly in the course of the discussions from a number of different points of view.
- The primary issue raised was the relatively large requirement for training of users, particularly in the case of complex equipment and multifunctional types of equipment.
 - New and potentially valuable systems or services can have their acceptance severely retarded if they are installed with an inadequate level of user training.
 - A prime example of this is the use of features on computerized PBXs.
 - Most of the users who have computerized PBXs agree that the installed features are not in fact being fully utilized.
 - Most of these users blame the vendor for the inadequacy of training on these features.

- One specific comment was that it took eight months to get a list from the telephone company of the features which were installed on a PBX.
- The major contributor to the requirement for training is the high level of turnover in most organizations.
- Some organizations with relatively sophisticated and repetitive kinds of operations regard training as a manageable item.
- A reservation system discussed has over 600 built-in, three-key functions and is apparently being used efficiently by its operators.
- Essentially all the participants regard training as a vendor requirement, and they believe that the vendors are performing this function inadequately.
- Most participants feel that the vendors are backing off from the subject of training because of its expense.
- The solution to the training problem is regarded by users as something that could and should be built into the equipment.
- It should be built into the equipment, primarily in the form of simplicity or improved functionality.
- It could also be installed in the equipment in the form of a computer-assisted training program for operators.

3. SURVEY DATA

- There was no survey data on training.

4. IDENTIFIED PROBLEMS

- One problem derived from the discussions is that the responsibility for the end user training is divided between the vendor and the customer.

5. IDENTIFIED PLANS

- There were no clearly identified plans.

6. LEVEL OF PARTICIPATION

- The level of participation was high.

7. LEVEL OF UNDERSTANDING

- There was a high level of understanding of the problem.

8. LEVEL OF AGREEMENT

- There were many ideas on solutions but little agreement on the preferred solution.

9. CONCLUSIONS

- End user training in the use of office information equipment is a severe and growing problem.
- It is a problem primarily because neither user nor vendor is taking responsibility for it.

H. USER SELF-MAINTENANCE

1. DESCRIPTION

- The maintenance of new office information equipment encompasses a series of functions which may be performed by the users themselves with economic and functional advantages.
 - This subject addresses the users' willingness and capabilities to perform such maintenance functions themselves.

2. DISCUSSION

- Few of the participants were enthusiastic about the possibilities of self-maintenance.
 - Apparently, this stems from the existing level of difficulty in performing functions such as communication management which are already inadequately staffed.
- A number of values were seen by some users for the performance of maintenance by the user himself.
 - These were, primarily, decreases in delays in moving equipment from one location to another and reduction in repair intervals.

3. SURVEY DATA

- There was no survey data on user self-maintenance.

4. IDENTIFIED PROBLEMS

- The unavailability of technically trained personnel, as shown in Exhibit V-3, is seen as a problem.

5. IDENTIFIED PLANS

- There were no identified plans for user self-maintenance .

6. LEVEL OF PARTICIPATION

- The level of participation was low.

7. LEVEL OF UNDERSTANDING

- A few participants understood what was involved and foresaw some possibilities for self-maintenance.
- Generally, the participants had no real feel for the issue.

8. LEVEL OF AGREEMENT

- There is no basis for an agreement here.

9. CONCLUSIONS

- Users would require an extensive level of awareness training to accept any significant amount of self-maintenance responsibility.

EXHIBIT V-3

MAINTENANCE PROBLEMS - PERCENT OF RESPONDENTS

TYPE OF PROBLEM	NOT A PROBLEM	SOMEWHAT OF A PROBLEM	MAJOR PROBLEM
A. Equipment Failure Diagnostics	53%	37%	10%
B. Equipment Repair On-Site	62	30	8
C. Down Time of Present Equipment	61	34	5
D. "Finger Pointing" in Multi-Vendor Environment	40	35	25
E. Ability to Get Budget Approval For Diagnostic Equipment	60	30	10
F. Technical Ability of Company Personnel	47	40	13
G. Location and Availability of Vendor Service	52	43	5
H. Availability of Spare Parts	55	38	7

VI SELECTION OF EQUIPMENT AND VENDORS

VI SELECTION OF EQUIPMENT AND VENDORS

- The issues addressed in the following section relate to the processes and policies by which users manage the acquisition of new office communications systems, equipment, and services.

A. ACQUISITION PROCESS

I. A STANDARD PROCESS

- Not one company had a specific process for acquiring communications equipment.
 - On the other hand, all companies had acquisition processes for general capital expenditures.
 - These are described below.
- Two basic processes exist.
 - One is initiated by the end user if it is a subsidiary, profit center, or division; for example, decentralized organizations.

- The other is initiated at the corporate level where planning occurs; for example, centralized organization.

- The processes are as follows:

- The initiator provides the request and a statement of need.
- He also provides the justification.
- A technical review is provided usually by MIS or data processing.
- Finance is used primarily to determine the method of financing but not the justification.
- Top management makes the final review depending upon the level of expenditure.

2. KEY PEOPLE

- The key people are:

- End user (if decentralized) for initiation.
- MIS/EDP (technical) for the technical review.
- Finance (lease or buy) for best alternatives.
- Vice President/President for final approval.

- In some instances, the Board of Directors gets involved in the final decision.

3. HOW ARE THEY SELECTED

- Only two companies had an acquisition team which was referred to as committees.
 - Therefore, responsibility rested with the function; for example, finance.
 - The committee was formed when the planning was on a project-by-project basis.
- There was no selection process, except for the committees.
 - In those cases, again, selection was by function such as finance, EDP, etc.

4. RELATIVE LEVEL OF INFLUENCE

- In all cases, the greatest influence was with the initiator.
 - Whether end user or corporate.
- Finance was perceived to be important in the method of payment but not as a veto source.
 - One exception was a company where finance looked at cash flows, cost of money and other economic factors.
- Top management was influential as a "veto" power after the justification had been established by initiators, finance, and technical.

B. FACTORS IN THE ACQUISITION

- Several factors were repeatedly offered for justification.
 - Cost was primary.
 - Flexibility and adaptability to a network were sited.
- User reaction was also an important factor.
- Performance was never a criteria because it could not be measured.
 - It was considered an intangible justification and factor.
- Costs were further broken into absolute cost, cost reduction, cost savings, tax implications; they may be ranked by importance as:
 - Absolute cost (one piece of communication equipment versus the other).
 - Cost savings (present equipment versus proposed equipment).
 - Cost reduction (savings on clerical/personnel cost).
 - Tax implication (cash flow, etc.).
 - Life cycle cost (not well understood).
- A key point relative to the variables involved in evaluating a purchase was that the variables change depending on the size of the project.
 - In a major project, there will be a significant amount of cost justification for the project.

- In a smaller or local project, there is frequently little or no cost justification involved.
- As mentioned earlier, most of the organizations ultimately agreed that significant purchase decisions are made by one man, sometimes a senior manager, sometimes a lower level functional manager with a sufficient track record of performance to have enough credibility to be backed up in his recommendations.

C. VENDOR SELECTION

1. A SPECIFIC POLICY

- Not one company had a specific written policy for vendor selection as if it were not a good policy to have such a policy.
 - Most felt a written policy was unwarranted.
- However, there were unwritten (assumed) policies.
 - Many used "blue chip" vendors where a policy of stability was assumed.
 - Therefore, it was a given and, as such, an unwritten policy.
 - Vendor support was also assumed where blue chip companies were the predominant vendor.

2. SUBSEQUENT PURCHASES

- A majority of companies do not have a different policy for add-on purchases.
- Each company felt that they judged the vendor on performance.

- If unsatisfactory, subsequent purchases could be effected.
- Those who had a different policy had a policy to stick with the original vendor.
 - A variation was one company which felt the first decision was more important because, thereafter, they stayed with that original vendor.

3. COMPATIBILITY STANDARDS

- All but two companies felt that compatibility standards were either very important or important.
- Some companies were adamant and would only deal with an IBM standard compatibility factor.
- The exceptions were:
 - One company who was establishing its own standards.
 - One company that used service bureaus extensively and was unaware of the issue.

4. EXISTING VENDOR

- All but three companies reported that the existing vendor's influence was either very important or important.
- The primary motivation here was that the vendor which was in-house could best provide compatibility, support, and continuity.
 - The exception was the company using service bureaus extensively.
 - Another exception was the innovator who was building its own network for marketing.

5. SINGLE VENDOR

- A vast majority want to deal with a single vendor on primary equipment such as the mainframe, the network, or word processing.
- As noted earlier in the discussion of compatibility solutions, most of the participants preferred a solution methodology where a predefined restricted list of acceptable vendors is established.
- Most recognized that a single vendor is unlikely to be able to satisfy all the needs of any organization.
- While preferring to reduce the number of vendors, some expressed a concern about reducing the number of vendors too greatly, for the following reasons:
 - As one put it, he does not want to repeat the AT&T control experience; competition is needed to prevent this.
 - Many participants foresee the potential danger of prematurely standardizing on some vendor or some particular type of approach.
- All companies felt that multiple vendors were fine for peripherals and PBX-type equipment.
 - It is a way to keep the primary vendor "on his toes."

6. SUPPORT

- Support to all was critical and, in most cases, the key factor.
- Most companies stated that IBM/PBX were selected solely because of support posture.

D. VENDOR INFLUENCE ON SYSTEM DESIGNS

1. DESCRIPTION

- This subject addresses the extent of users' recognition of the effect that vendors have had or are expected to have on the communication and office information systems.

2. DISCUSSION

- Very few of the participants seem to recognize the extent to which some vendors, particularly IBM and AT&T, have had an effect on their networks.
- One participant suggested that, in a centralized organization, vendors get very little opportunity to exert control over the way decisions get made.
 - In a decentralized organization, the vendors marketing activities can have a significant effect on the user organizations.
- Some felt that vendors with their products and services are, in many cases, creating solutions for nondefined problems.

APPENDIX A: QUESTIONNAIRES

FOCUS DISCUSSION GUIDE

The topics listed on the following pages will be discussed in sequence with a set following each of the videotape presentations.

I. "Telecommunication Trends And Outlook".

- Discussion Issues.
 - System Integration.
 - Intra-Building Networks.

II "Distributed Data Processing".

- Discussion Issues.
 - System Compatibility.
 - Cost Control.

III "Office Of The Future".

- Discussion Issues.
 - Organization And Training.
 - Work Stations.

The time indicated for each topic is a guide for the moderator and not an absolute limit. The prompts are intended to be used primarily as discussion starters.

OFFICE COMMUNICATIONS EQUIPMENT QUESTIONNAIRE

FIRST DISCUSSION

TELECOMMUNICATIONS ISSUES

TOPIC ONE - 20 - 30 Minutes

Integration of various types of communication and office systems.

1. Do you perceive any opportunities in your organization to integrate voice and data networks?

PROMPTS

- For which departments/functions?
- What is pushing it or inhibiting it?
- On long-distance leased lines?
- With acoustic coupled devices?

TIME: 3 - 5 minutes

2. What advantages do you perceive for such integration?

PROMPTS

- Reduction of line costs.
- Flexibility of network utilization.
- Price/cost stability.

TIME: 3 - 5 minutes

3. What risks or disadvantages do you perceive?

PROMPTS

- System reliability.
- User training.
- Vendor lock-in.

TIME: 1 - 3 minutes

4. Poll: In a five-year timeframe, how many believe your company will integrate data/voice communications?

TIME: 1 minute

5. What additional services do you perceive as being valuable on a private voice network?

PROMPTS

- Call detail recording.
- Least cost routing.
- Uniform numbering plan.

TIME: 5 - 8 minutes

6. Do you perceive an applications in your company for which a store and forward voice messaging system would be useful?

PROMPTS

- Announcements to field.
- Busy executives.
- Telephone efficiency improvements.

TIME: 3-8 minutes

7. What are the most important capabilities of a communications management system?

PROMPTS

- Management of voice and data.
- Control of network availability.
- Information for network planning.

TIME: 5-8 minutes

8. Do you perceive any significant requirement for store and forward facsimile?

PROMPTS

- Time zones.
- Automatic transmission.
- Fax to fax compatibility.

TIME: 3-5 minutes

9. Do you perceive any significant growth in requirements for high speed facsimile?

PROMPTS

- Cost reduction.
- Mail replacement.
- New user applications.

TIME: 3-5 minutes

TOPIC TWO - 10 - 15 Minutes

The needs and expectations for intra-building networks.

1. Poll: Do you believe that your existing PBX will address your office communication requirement for the next five years?

PROMPTS

- Why or why not?
- Data capability.
- Station/building growth.

TIME: 3 - 8 minutes

2. Poll: How many of you that don't have computerized PBX's plan to change to one in the next five years?

TIME: 1 minute

3. Do you now have or do you anticipate communication applications which would require wide band transmission within your building?

PROMPTS

- High speed (56 kbs and up) data.
- High terminal densities.
- Video.

TIME: 3 - 5 minutes

4. What is your position in the current debate among wideband architectures (Ethernet, Hyperchannel, etc.) and computerized PBX's?

PROMPTS

- Poll: How many feel sufficiently knowledgeable to take a position?
- Applicable special installations (computer centers, laboratories, etc.)

TIME: 3 - 5 minutes

OFFICE COMMUNICATIONS EQUIPMENT QUESTIONNAIRE

SECOND DISCUSSION

DISTRIBUTED DATA PROCESSING

TOPIC THREE - 15 - 25 Minutes

The requirements for equipment and system compatibility and for compatibility matching services.

1. How big a problem is incompatibility between products and/or systems from different vendors?

PROMPTS

- Duplicate equipment required as a result.
- Application limitations.
- Growth limitations.

TIME: 1 - 3 minutes

2. When you have a choice between selecting a single vendor or multiple vendors for a system, is compatibility a factor in the choice?

PROMPTS

- Nationally distributed systems.
- Future planning.
- Application scope.

TIME: 1 - 3 minutes

3. For your word processing and data processing systems, how many CPU and terminal vendors do you have?

TIME: 0 - 1 minute

4. What advantages or disadvantages do you perceive in having a single systems vendor?

PROMPTS

- Problem coordination.
- Lack of user independence/control.
- Reduced flexibility.

TIME: 3 - 5 minutes

5. What are the most preferred solutions to incompatibility problems?

PROMPTS

- Single vendor systems.
- Protocol converter boxes.
- Compatibility matching services.

TIME: 1 - 3 minutes

6. How long do you foresee the need to retain compatibility with obsolescent products and systems, e.g., Bisyne, 2260, etc.?

PROMPTS

- Until products wear out.
- When population is small enough to force out remainder.
- Depends on equipment type (e.g., terminal versus CPU's, word processor).

TIME: 1 - 3 minutes

7. Do you perceive any significant user requirements for data/text messaging systems?

PROMPTS

- Computer files in text printers.
- Text messages to remote locations.
- correspondence tracking.

TIME: 3-5 minutes

8. Do you foresee any significant system requirements for or encryption improved security capabilities?

PROMPTS

- Financial messages.
- Transborder data problems.
- Company confidential data.

TIME: 3-5 minutes

TOPIC FOUR - 5 - 15 Minutes

The methods by which organizations measure economic factors such as productivity and effectiveness and the methods by which systems and equipment acquisitions are justified.

1. What measures does your company apply to the effectiveness of business communications equipment?

PROMPT

- Level of user complaints.
- Objective measurements (response time, grade of service).
- Percent of revenue.
- Informal/subjective measurement.
- None.

TIME: 3 - 8 minutes

2. How appropriate do you believe that these measures are?

PROMPT

- Long-term guideline.
- Could be improved with further analysis.
- Measures of little value.

TIME: 0 - 3 minutes

3. In evaluating whether to purchase new equipment, what are the key variables?

PROMPT

- Cost avoidance.
- Cost minimization.
- Productivity improvements.
- New applications requirements.

TIME: 3 - 8 minutes

OFFICE COMMUNICATIONS EQUIPMENT QUESTIONNAIRE

THIRD DISCUSSION

OFFICE OF THE FUTURE

TOPIC FIVE - 15 - 30 Minutes

Communications requirements at the work station.

1. In your strategic planning for the 1985-1995 timeframe, what is seen as the information focal point for the office?

PROMPTS

- PBX.
- Wideband network.
- Word processing workstation.
- Computer terminal.

TIME: 3 - 8 minutes

2. What functional organization within your company is most likely to control the evolution of these intra-building networks?

PROMPTS

- Communications.
- Data processing.
- Office management/automation.

TIME: 3 - 5 minutes

3. Will the vendors of word processing, data processing, and communications equipment influence what kind of intra-building network you install?

PROMPTS

- Which types of product vendors are key?
- In what way will they influence the decision?
- Effects of vendor standardization.

TIME: 0 - 3 minutes

4. Poll: In a five-year timeframe, how many believe your company will have integrated word processing/communications systems?

TIME: 1 minute

5. What do you foresee in multifunction terminals or work stations?

PROMPTS

- Functions to be performed on them.
- Products you expect from vendors in this area.
- Use at management level.
- Multiple interfaces.
- Price levels.

TIME: 0 - 8 minutes

6. Do you perceive any significant requirements for integrated (text, data, graphics, voice) filing systems?

PROMPTS

- Engineering.
- Correspondence.
- Signatures.

TIME: 3-8 minutes

7. How extensive will be the use of video conferencing in your company by 1985? .

PROMPTS

- How many video conference rooms?
- Applications.
- Justification.

TIME: 3-8 minutes

8. How significant are your users' requirements to interconnect with external data base sources?

PROMPT

- Rate of growth.
- Number of users.
- Number of data bases.

TIME: 1 - 3 minutes

9. Would an improved access process, such as single button, enhance the utility or usage of such data bases?

PROMPT

- Uncontrollable.
- Depends on costs.
- Depends on output media available to users.

TIME: 1-3 minutes

TOPIC SIX - 5 - 10 Minutes

Office Productivity.

1. Do you apply any measures to office worker productivity?

PROMPT

- Level of management complaints.
- Employees per dollar of revenue.
- Informal/subjective.
- None.

TIME: 3 - 8 minutes

2. Do you use any of these measures to assist in the justification of equipment acquisitions?

PROMPT

- How much weight do they carry?
- Effective for replacement or new equipment?

TIME: 1 - 3 minutes

TOPIC SEVEN - 5 - 10 Minutes

The need for user training.

1. Do you perceive any significant changes being required in the level of training provided for users of office communication products?

PROMPT

- Internal versus external training.
- Courses, seminars.
- Training manuals, text.
- Hotline services.

TIME: 3 - 5 minutes

2. How do you expect this training to be provided?

PROMPT

- Vendors.
- Company staff.
- Specialized companies.

TIME: 1 - 5

TOPIC EIGHT - 5 - 10 Minutes

User self-service activities.

1. What advantages and disadvantages do you perceive in users participating in the installation and service aspects of business communication equipment?

PROMPTS

- Do you have the internal expertise?
- Cost as an incentive.
- Increased uptime as an incentive.
- Risks perceived.

TIME: 5 - 10 minutes

2. Do you perceive any value in having an on-line directory of company personnel, telephone numbers, mail addresses, etc.?

PROMPTS

- Depends on cost.
- How addressed?
- Who maintains?

TIME: 3-5 minutes

TOPIC NINE - 20 - 25 Minutes

General requirements for value added services.

1. What requirements do you perceive for business graphics in your company?

PROMPTS

- Analysts or managers.
- Presentations or analyses.
- CRT's or printed.

TIME: 3-5 minutes

2. Special graphics capabilities such as color or very high resolution.

PROMPTS

- Trends.
- Sprcial applications.

TIME: 3-5 minutes

3. Do you perceive any requirements for multi-media communications, e.g., voice/fax, fax/data, etc.

PROMPTS

- Engineering.
- Signatures.

TIME: 3-5 minutes

4. For these and for the other value added service do you have a preference for the method of provision, e.g., terminal, data processing system, PBX, service vendor, etc.

PROMPTS

- Economics.
- Convenience.
- User control.

TIME: 5-8 minutes

5. For these value added services what is your opinion on the required reliability of such services as compared to the reliability on the basic services to which they are added?

PROMPTS

- More valuable.

- Less critical.

TIME: 3-5 minutes

DEFINITIONS

The following is a series of product/service terms used in the presentation and in the discussions. In order to have a common frame of reference, we have prepared INPUT's definition/description for use today.

1. PRIVATE VOICE NETWORKING

- Uniform numbering plan across several locations.
- Least cost routing tables that consider private network facilities originating at other locations.

2. DATA/TEXT MESSAGING VOICE MESSAGING

- Nonsimultaneous communications.
- Send and receive messages as convenient, regardless of other party availability.
- One to one or one to many.

3. COMMUNICATION MANAGEMENT IN-HOUSE ADMINISTRATION AND MAINTENANCE CAPABILITY

- User-accessable and user-controlled capabilities for administration, problem determination, network adjustments and other communication management functions.
- Move control.
- Traffic data collection.
- Backup line activation.

4. SECURITY AND ENCRYPTION FEATURES

- Controlled access to communications and information facilities.
- User controlled encryption of transmitted and stored information.

5. INTEGRATED FILING

MULTIMEDIA FILING

(Data, Text, Graphics)

- Ability to store and retrieve information electronically in multiple forms.
- Examples: Signature documents, hand-written documents, documents with graphics, reports with annotations.

6. SIMPLIFIED ACCESS TO DATA BASES

SINGLE-BUTTON ACCESS TO DATA BASES

- Automated-connection and log-on procedures for terminal to computer connection.

7. ON-LINE CORPORATE DIRECTORY

- Computer accessible directory of names, telephone numbers, addresses, titles, facsimile access, etc.

8. GRAPHICS

- Interactive preparation, presentation and modification of data in graphic form, for example, bar graphs, pie charts, trend lines, etc.

9. IMAGE COMMUNICATIONS

- High-speed (2+ pages per minute), high resolution (copier quality) facsimile.

10. DESK-TO-DESK MULTIMEDIA CONFERENCING

(Voice With Data/Text, Voice With Image)

- Simultaneous communications of voice with data, text or image transmission at users' desks.

INPUT SURVEY OF OFFICE COMMUNICATIONS REQUIREMENTS

SUMMER, 1981

INTRODUCTION

INPUT is conducting a survey of office communications — your equipment, your problems, your requirements.

We would appreciate your completing the following questionnaire. Your answers will remain completely confidential, and will be combined with the answers of other decision-makers like yourself.

Please answer all questions to the best of your ability. If uncertain of an answer, please provide your best estimate.

For your convenience in returning the questionnaire a self-addressed stamped envelope is enclosed. Please return the questionnaire to us within two weeks.

At the conclusion of this study, INPUT will be sending to you a "Thank You" package including summaries of this study as well as the results of related research studies.

Thank you for your time and attention.

Your Title:

Company Name and Address:

7. Number of people reporting to you directly _____, indirectly _____.

8. Number of years with present company _____.

9. Number of years with communications related responsibilities _____.

10. Think about the last time you participated in a decision made by your organization to purchase a major piece of communications equipment or service. What was the level of the role which you played in each stage of the process?

	STAGE	ROLE	SOME ROLE	MAJOR ROLE
A.	Identification of Needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.	Identification of alternative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.	Analysis of alternative solutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D.	Equipment specification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E.	Proposal to vendors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F.	Evaluation of vendors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G.	Cost justification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H.	Budget approval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I.	Final vendor selection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

III CURRENT AND PLANNED OFFICE COMMUNICATION EQUIPMENT

(Please answer these questions for your location only, where location refers to your building or cluster of buildings.)

	Current #	Projected for 1985 #
1. Voice Communications		
A. PBX's	_____	_____
B. Number of lines	_____	_____
C. Centrex	_____	_____
D. Number of lines	_____	_____
E. Telephone Answering Devices	_____	_____
2. Data Communications		
A. Number of Data Communication Terminals		
• Intra Building connected only	_____	_____
• External connection only	_____	_____
• Internal and External connections	_____	_____
B. Method of connection of intra-building terminals (by number of terminals)		
• Direct connect	_____	_____
• Cluster controller	_____	_____
• Lin. Dist. Modem	_____	_____
• PBX	_____	_____
• Other (Specify _____)	_____	_____
C. Method of connection to external communication services (by number of terminals)		
• Dedicated line	_____	_____
• Cluster controller	_____	_____
• MUX/Concentrator	_____	_____
• Dial-up - separate business line	_____	_____
• Dial-up - through PBX	_____	_____
• Other (Specify _____)	_____	_____
D. Transmission Speeds (by percentage of lines)		
• At or below 1200 bps	_____ %	_____ %
• Above 1200 bps to 9600 bps	_____ %	_____ %
• Channel connected	_____ %	_____ %
• Other (Specify _____)	_____ %	_____ %

	#	#
E. External Data Communication Lines		
• Private dedicated lines -	_____	_____
• Private dedicated lines - with MUX or Concentrator	_____	_____
• DDS or Data route	_____	_____
• Packet switched services	_____	_____
• Other (Specify _____)	_____	_____

3. Record Communications

A. TWX or Telex terminals	_____	_____
B. Private Line Teletype Network	_____	_____

4. Image Communications

A. Low speed fax (4-6 min./page)	_____	_____
B. Medium speed fax (∠ 1 to 4 min./page)	_____	_____
C. High speed fax (16-59 sec./page)	_____	_____
D. Very high speed fax (∠ 15 sec./page)	_____	_____

5. Computers

A. Mainframe, IBM and compatible	_____	_____
B. Mainframe, Other	_____	_____
C. Number of computer communication ports	_____	_____
D. Minis (do not count word processing minis)	_____	_____
E. Remote timesharing service vendors	_____	_____

6. Text processors

A. Word processing terminals	_____	_____
B. Word processors equipped with communicators	_____	_____

7. Copiers

A. Copiers outside of central repro facilities	_____	_____
B. Intelligent copiers	_____	_____

8. Local Area Computer Networks (e.g., Ethernet)

9. Teleconferencing Facilities

A. Rooms with voice and facsimile or graphics	_____	_____
B. Rooms with Video	_____	_____
C. Individual desks with facsimile or graphics	_____	_____
D. Individual desks with video	_____	_____

10. Miscellaneous Special Capabilities

A. PBX with data capability	_____	_____
B. Voice Store and Forward Users	_____	_____
C. Combined Voice/Data Trunks	_____	_____
D. Satellite circuits	_____	_____
E. Electronic mail users (private)	_____	_____
F. Electronic mail users (vendor)	_____	_____
G. Private Microwave links	_____	_____
H. Cellular Radio Service links	_____	_____

11. Please estimate the percentage of data traffic which remains within your location? (As opposed to being transmitted to a remote location.) _____

IV. NEW SERVICES

1. Please indicate whether you are familiar with each of the following office communication services. For each service you are familiar with, please indicate the amount extra you would be willing to pay to obtain it, whether it is now in use or when a purchase is planned.

Service	Familiar?		Would pay a premium of				Now in Use	When Planned?
	Yes	No	None	5%	10%	20%		
A. Speed, code, protocol conversion for data terminals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
B. Speed, code, protocol conversion for communicating word processors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
C. Voice Messaging								
(store and forward)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
D. Data/Text messaging								
(store and forward)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
E. Store and forward facsimile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
F. High speed								
high resolution facsimile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
G. Integrated data, text, graphics filing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
H. Video conferencing								
Conference Room	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
I. Video conferencing								
Desk to Desk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
J. Single button access to databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
K. On-line corporate directory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
L. Security and encryption features								
On Telephones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
M. Security and encryption features								
On Data Networks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
O. PBX Based								
Local Area Network	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
P. Coax Cable								
Local Area Network	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>
Q. Computer or Graphics								
Aided Teleconferencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<div></div>

2. From the list of services above, select the one you are most interested in and write its name here:

3. What are your minimum performance requirements for this service?

- A. Uptime: %
 B. Mean time between failure: hours
 C. Mean time to respond: hours
 D. Mean time to restore: hours

4. What percentage of office workers in your organization would use this service in 1985? %

5. Does your company measure office worker productivity ?

- ☐ No
☐ Yes How?
☐ No, but plans to.

6. Does your company measure the effectiveness of its communications equipment?

- ☐ No
☐ Yes How?
☐ No, but plans to.

7. Which ones of the following protocols and interfaces do you have implemented at your location?

- | | |
|--|---------------------------------------|
| <input type="checkbox"/> Teletype (ASCII, Asynchronous) | <input type="checkbox"/> X.3 |
| <input type="checkbox"/> 2740 | <input type="checkbox"/> X.21 |
| <input type="checkbox"/> 3270 BSC | <input type="checkbox"/> X.28 |
| <input type="checkbox"/> 3270 SDLC | <input type="checkbox"/> X.29 |
| <input type="checkbox"/> 2780 | <input type="checkbox"/> RS-232-C |
| <input type="checkbox"/> HASP | <input type="checkbox"/> CCS-7 (x.60) |
| <input type="checkbox"/> Other IBM (Specify _____) | |
| <input type="checkbox"/> X.25 | |
| <input type="checkbox"/> X.75 | |
| <input type="checkbox"/> Telex | |
| <input type="checkbox"/> Communicating Word Processors | |
| (Specify Vendors _____) | |
| (_____) | |
| (_____) | |
| <input type="checkbox"/> Teletex (the CWP communication service) | |
| <input type="checkbox"/> Teletext (Telidon, Viewdata, etc.) | |
| <input type="checkbox"/> Other (Specify _____) | |

8. Please indicate your interest in obtaining the following conversion capabilities. Also estimate the potential annual value to your company to perform these conversions at your location.

Conversion	Level of Interest			\$ Value per line	Potential Number of lines
	Low	Medium	High		
A. TTY to/from 3270 BSC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$ _____	_____
B. TTY to/from 3270 SDLC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
C. TTY to/from 2780/3780	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
D. TTY to/from Other (Specify _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
E. X.25 to/from 3270 BSC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
F. X.25 to/from 3270 SDLC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
G. X.25 to/from 2870/3780	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
H. X.25 to/from Other (Specify _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
I. CWP to/from CWP (Specify vendors _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
J. CWP to/from Teletex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
K. Facsimile from DP Systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
L. Facsimile to DP Systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____
M. Other (Specify _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____

9. What devices or applications do you foresee for your organization which would require communication speeds of
 19.2 Kbs or faster _____
 56 Kbs or faster _____

V. COMMUNICATION PROBLEMS

1. Please rate the extent to which you perceive each of the following as a problem in your organization.

Area	Not a problem	Somewhat of a Problem	Major Problem
Voice Communications			
A. Encountering busy, no answer, or other party unavailable conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Information to permit management of PBX/Centrex and trunk capacities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Providing enhanced PBX/Centrex services to multiple locations in a city	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. User understanding of available voice services at your location	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Access to voice conferencing capabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Telephone wiring which constrains telephone placement in offices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Maintaining up-to-date internal directory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Other (specify _____)			

	Not a problem	Somewhat of a Problem	Major Problem
Data Communications			
A. Compatibility of different manufacturers communicating word processors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Terminal speed, code, and protocol conversion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Communications cabling for multiple terminals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Interface of local area networks to out of building networks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Mixing of high and low volume devices on same circuits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Other (specify _____)			
Image Communications			
A. Facsimile quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Facsimile speed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Compatibility of different fax machines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Other (specify _____)			
Communications Management			
A. Data network monitoring systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Voice network monitoring systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Traffic data collection and analysis systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Remote diagnostic capabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Other (specify _____)			
Maintenance			
A. Equipment failure diagnostics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Equipment repair on site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Down time of present equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. "Finger pointing" in multi-vendor environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Ability to get budget approval for diagnostic equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Technical ability of company personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Location and availability of vendor service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Availability of spare parts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Other (specify _____)			

VI. BUDGETS

1. Please estimate your organization's annual budget for:

A. Voice and data communication services:

\$ _____

B. Voice and data communication equipment:

\$ _____

C. Data processing:

\$ _____

D. Word processing:

\$ _____

2. Does your organization employ charge-back systems to users?

☐ Yes
☐ No
☐ Partial
☐ All charged back

3. Please estimate the annual expenses **at your location** for:

A. Intra-building mail service:

\$ _____

B. Gov't. postal services:

\$ _____

C. Courier Services

\$ _____

D. Copiers (including rental, supplies, service, and paper):

\$ _____

YOU ARE DONE!
THANK YOU FOR YOUR COOPERATION!

QUESTIONNAIRE FOR DISCUSSION PARTICIPANTS

We would like to obtain your individual expectations for the implementation in your organization for some of the Office Communications Services which we have been discussing.

We will, as always, be sending to you a "Thank You" package summarizing these results, along with the copies of the presentation slides.

Your Name _____
Title _____
Company/Agency _____
Address _____

Total number of people at your location _____

Number of office workers _____

Percentage of office workers who are:

Management/professional _____ %

Clerical/secretarial _____ %

Total number of data communication
terminals at your location _____

1985 COMMUNICATION SERVICES

For your location, please indicate whether you expect your organization to have implemented each of the following services in 1985, assuming they are available. For each of the services, assuming it has been implemented, please estimate for 1985 the number of users, average usage and the maximum you would be willing to pay.

	IMPLEMENTED IN 1985		NUMBER OF USERS IN 1985 (PERCENT OF OFFICE WORKERS)	AVERAGE USAGE/USER		MAXIMUM WILLING TO PAY (DOLLAR/MONTH PER USER)
	YES	NO		FREQUENCY (NUMBER TIMES/DAY)	DURATION (MINUTES/USAGE)	
<u>A. BASIC DESK COMMUNICATIONS - (2 POINT COMMUNICATION)</u>						
VOICE (TELEPHONE)	_____	_____	_____ %	_____	_____	\$ _____
DATA/TEXT TERMINALS	_____	_____	_____ %	_____	_____	_____
IMAGE*	_____	_____	_____ %	_____	_____	_____
VIDEO (AT DESK)	_____	_____	_____	_____	_____	_____
VIDEO (IN CONF. ROOM)	_____	_____	_____	_____	_____	_____
<u>B. DESK TO DESK MESSAGING - (STORE AND FORWARD)</u>						
VOICE	_____	_____	_____	_____	_____	_____
DATA/TEXT	_____	_____	_____	_____	_____	_____
IMAGE*	_____	_____	_____	_____	_____	_____
<u>C. DESK TO DESK MULTI-MEDIA CONFERENCING - (3 OR MORE PEOPLE)</u>						
VOICE & DATA/TEXT	_____	_____	_____	_____	_____	_____
VOICE & IMAGE*	_____	_____	_____	_____	_____	_____
<u>D. ELECTRONIC FILING AND RETRIEVAL</u>						
VOICE	_____	_____	_____	_____	_____	_____
DATA/TEXT	_____	_____	_____	_____	_____	_____
IMAGE*	_____	_____	_____	_____	_____	_____
<u>E. SPECIAL SERVICES</u>						
ON-LINE DIRECTORY	_____	_____	_____	_____		_____
SIMPLIFIED DATA BASE ACCESS	_____	_____	_____	_____		_____
VOICE ENCRYPTION	_____	_____	_____			_____
DATA ENCRYPTION	_____	_____	_____			_____
SPEED, CODE & PROTO-COL CONVERSION			(PERCENT OF TERMINALS USING)			(\$/MONTH PER TERMINAL USING)
FOR DATA TERMINALS	_____	_____	_____			_____
FOR COMMUNICATING WORD PROCESSORS	_____	_____	_____			_____

*NOTE: IMAGE IMPLIES HIGH SPEED (2+PAGES/MINUTES) HIGH RESOLUTION (COPIER LEVEL) FACSIMILE.

DEPTH INTERVIEW OUTLINE

A. COMPANY'S COMMUNICATION PLANS

1. Is there a comprehensive communications plan for the company? What are its major components? Do separate voice/data plans exist?
2. What is its scope in time? (Number of years.)
3. What is it in organization? (Voice, data, office automation, etc.)
4. What is it in geography? (Entire company, long distance only.)

5. Who is responsible for preparing this plan?
6. Who is responsible for implementing this plan?
7. How is it prepared? (In-house staff, consultants, users involved.)
8. Would you describe communication organization as initiating or reactive relative to end user needs?
9. Does your company have a new office building in the planning stage? How is the communications planning for it being handled?

B. COMMUNICATION EQUIPMENT/SERVICES ACQUISITION PROCESS

1. Is there a standard acquisition process? Please describe. (Steps taken, length of time, participation, levels of approvals)
2. Who are the key people involved in this process?
3. How are they selected?
4. What is their relative level of influence?

2. Who are the key people involved in this process?

3. How are they selected?

4. What is their relative level of influence?

5. What are the key factors considered in the acquisition?

- () Life cycle cost.
- () Cost reduction.
- () Obsolescences.
- () User training.
- () Tax implications.
- () Work load.
- () Flexibility.
- () Back-up.
- () Other. _____

5. Is a single vendor installation considered more favorably than a multi-vendor installation? How important is product line breadth?
6. How significant the vendors' ability to provide further support? (Maintenance, user training, documentation)
- () Very important.
 - () Important.
 - () Some importance.
 - () None.

D. THE IMPORTANCE OF COMMUNICATIONS TO THE COMPANY

1. How would you describe the importance of communications to your business?
Is it support or a competitive advantage?

 - () Very important.
 - () Important.
 - () Some importance.
 - () None.

2. What would happen to your business if your communications networks failed?
(Voice, data, other)

3. Would a product of provable or guaranteed better reliability be worth more?

4. How much more?

5. What kinds of products are more subject to this higher reliability value?

6. Which are not?

7. Does your company place any value on communication performance? (Saving of executive time, people replacement, prior years budgets)

E. SYSTEMS INTEGRATION

1. What opportunities do you see for interconnection or intergration of different communications systems?
 - () Voice/data.
 - () Data/word processing.
 - () Mail/data processing.
 - () Other. _____

2. What would be the justification of such integration? (Cost, flexibility, space reduction)
 - () Cost.
 - () Flexibility.
 - () Savings.
 - () Other. _____

3. What influence, positive or negative, would vendors have on such integration?
 - () Positive.
 - () Negative.
 - () None.
 - () Unknown.

4. What functions do you see being performed by an integrated terminal (work station)? (Data, voice, text, local storage) Do you have private voice network?

5. Do you see any opportunity to integrate the building energy management and/or security systems into the building communication network?
6. What is your estimate of the cost of wiring such systems separately?
7. Do you plan to install Coax in any of your buildings?

APPENDIX B: DATA BASE

EXHIBIT B-1

FOCUS GROUP ATTENDEES - BY RESPONSIBILITIES

SCOPE OF RESPONSIBILITIES	NUMBER OF ATTENDEES	PERCENT OF TOTAL
Communication	28	13%
Data Processing	46	23
Office Automation	48	24
Planning	16	8
MIS	21	11
Other	43	21
Total	202	100%
LEVEL OF RESPONSIBILITIES		
VP	22	11%
Director	36	18
Manager	74	37
Other	70	34
Total	202	100%

EXHIBIT B-2

FOCUS GROUP ATTENDEES -
BY INDUSTRY

INDUSTRY	NUMBER OF ATTENDEES	PERCENT OF TOTAL
Manufacturing	103	50%
Banking and Finance	31	19
Government	16	7
Insurance	28	13
Other	24	11
Total	202	100%

